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GEOGRAPHICAL DISTRIBUTION

OF

ANIMALS AND PLANTS.

By Charles Pickering

CHAPTER I.

INTRODUCTION.

The observations recorded in the following pages were made principally to ascertain the geographical distribution of animals and plants. However familiar one may be with distant countries, personal experience is not easily communicated; I have sought, therefore, to supply a groundwork of facts, that may remain, whatever may be the deductions drawn from them. In general, I have avoided discussion; but at the outset, some expression of views respecting species and their origin seems to be required.

Geological investigations have shown that our Earth was once inhabited by animals and plants, all of them widely different from those now found upon its surface. The course of generations has been interrupted, a whole system of species has been swept away, and a new system established upon every part of the Earth's surface.

It is clear, then, from Geology, that the human family has had a beginning; the future, too, seems distinctly foreshadowed; but, in the subject under consideration, our business is with the present and the past.

How long has the present system of species been in existence?—It is a fact, so familiar as to escape notice, that all civilized nations are engaged in keeping a reckoning of the days. However various the

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calendars in use, each day is recorded as it passes; and by this means mainly, the dates of historical events have been preserved. This practice has been kept up from more remote antiquity than is commonly supposed: the Egyptians knowing the year in which every one of their principal buildings was commenced, as certainly as men of the present generation know the year of the battles of the last ten centuries. In a Desert climate that guards the work of human hands, the dates of all the principal events in history are probably recoverable, up to the days of Menes, eight hundred years before the building of the largest Egyptian pyramid, and very nearly six thousand years ago. Already in the days of Menes, the human family was far from being in the state of primeval simplicity: there were armies in martial array; military campaigns in foreign lands; an aristocracy scheming; the medical profession, and the trade in drugs; gold-washing and jewels; an established judiciary; a priesthood; a crowded population at home; the linen manufacture; and the full complement of the manifold employments, arts, and trades of advanced civilized society.

By means of the characters in use in writing, we can go yet further back in history; to that anterior epoch when they were selected. These characters, termed hieroglyphic, represent the implements, the familiar animals and plants, the monotheism, the associations, and placed in a certain order of arrangement, make up the drama of Bedouin life. And here all human records end.

The figures of the animals and plants in hieroglyphic characters, and in paintings and sculptures extant from the century preceding the building of the Great Pyramid, afford abundant evidence, that, during this long interval, no change has taken place in the system of species: the hyena, the capricorn, the hedgehog, the house-sparrow, the barn-owl, the red-legged partridge of six thousand years ago, were precisely the same animals as at the present day.

After examining the historical records along the river-valley of the Nile, let the traveller walk out into the Eastern Desert. Its surface is strewed with fossil timber; blocks are in sight that Menes may have stumbled over when he first led an army out of Egypt, and the last six thousand years are but as a day. Anterior, then, to the existing system of species, there was a period of time when there were rains and forests in the North African Desert.

Even in America, we can look upon objects belonging to this Anterior Period: upon morasses that contain the skeletons of mired masto-

dons; upon salt-licks and caves, strewed with the scattered relics of extinct species of quadrupeds.

On leaving Egypt, we no longer have the aid of ascertained dates. Certain portions of coral islands are probably older than any human record; yet the relics of animals of which they are composed, belong without exception to existing species.

While the mass of mankind have been engaged in enforcing opinions, a means of measurement has existed upon a secluded island in the Pacific; a perennial fountain of lava; the molten rock by its clepsydra-like passage from the deep interior of the planet, marking time ever since the work of creation ceased.

The next question to be considered, is that of the contemporaneous beginning of existing species. There is, perhaps, no evidence, that an additional species of animal or plant has made its appearance upon our planet during the last six thousand years; but the following observed facts seem to require further examination and explanation:

The coral islands, composed of the relics of existing species of marine animals, project a few feet above the surface of the ocean; and, at the present day, are occupied by a variety of land animals and plants. If species, whether land or marine, were all contemporaneous in their beginnings, there should be no peculiar species upon coral islands. In sailing over the Pacific, this was abundantly tested; and on every low coral island we visited, the species of land animals and plants proved to be derived from abroad; *Helicidæ*, carefully searched for as including some excessively local species, being absent.

There is possibly a different state of things on Metia. This is a coral island like the rest; but an elevated one, forced up by some change in the Earth's crust, two hundred and fifty feet or so out of the water. It is situated about a hundred miles north of Taheiti, the nearest rocky island. On Metia, Mr. Couthouy discovered three diminutive species of land-shells (named by Gould, *Helix pertenuis*, *Helix dædalea*, and *Partula pusilla*); species that we did not meet with elsewhere. It is true, minute land-shells may be transported to a distance even by the winds, and the Taheitian Group contains several high islands which we did not visit; but if, after full examination, any one of these species of land-shells shall prove peculiar to Metia, here will be an instance of a non-contemporaneous exercise of creative power: the island emerged from the ocean after the commencement

of the existing system of marine species, and only after the emerging could land-shells be supplied.

In the course of our voyage, some other instances were observed, where the origin of species did not seem strictly contemporaneous:— Tufts of sea-weed floating in mid-ocean, but originally detached from coasts, are accompanied by marine animals, that neither belong to coasts, nor are properly oceanic. It is true, these accompanying species occur equally around floating animal substances; as around the central cartilage of velellas, around bunches of ova of various kinds, but not around living animals.

Further: marine plants in general do not occur upon animal substances; but various diminutive species are attached to the tufts of floating sea-weed. Some of these species may prove distinct from any growing on coasts; and if so, we shall be at a loss for a contemporaneous basis, unless we resort to the rarely met with floating pumice of the Mineral Kingdom.

The Extinction of species, seems more comprehensible than the Creation of new ones, and may sometimes be accounted for. There are good reasons for believing, that the clumsy bird called the *dodo*, has become extinct within two or three centuries: and, among the modifications of the Earth's surface induced by human occupancy, other species of animals and plants may disappear at no distant day, especially those restricted to small ocean islands. But this is a different question from the extinction of a whole system of species.

While the land and water surface of the globe has remained essentially the same as at present, a system of species has been created, maintained by generations throughout a very long period of time, extinguished, and our existing system substituted.

But there has been a period when the Configuration of the land and water was entirely different; when the larger portion of what is now land, to the tops of the loftiest mountain-chains, was the bottom of the sea; and when parts of the present bottom of the sea may have been dry land. At this ancient geological Period, there was yet a Third System of species. Even with the ensuing disturbance of the rock-strata, it may be difficult to account for a simultaneous extinction of every aquatic species.

CHAPTER II.

THE DIFFUSION OF SPECIES.

The Coral Islands being excepted, Creative power has been exercised upon every part of the Earth's surface. Each separate island of the Hawaiian Group contains land-shells, species of *Helicidæ*, that are not found on the neighboring islands, nor in any other part of the whole globe; species, whose generations during the whole period of human history have never wandered beyond the area of a few square leagues.

If we search for the cause of restriction, we shall find it in these animals and their ova perishing in sea-water. On the other hand, the marine shells inhabiting the same Hawaiian Group, in conformity with their aquatic ova, that can be safely transported by the currents of the ocean, are in general very widely diffused: I have myself met with live specimens of the *Cypræa tigris* from the Hawaiian throughout the Southern Polynesian Groups and the East India Islands, to the Eastern coast of Africa; over an area thirteen thousand miles in length, and including one-fifth of the surface of the globe. At the present day, it may not be possible to ascertain the original home of the Cypræa tigris; but may we not conclude, that the species was called into exstence by the same means and in the same manner as the Hawaiian land-shells, and in all probability, in geographical limits equally restricted.

The *Lecidea geographica*, a lichen incrusting the surface of rocks towards the limit of perpetual congelation, occurs except towards the poles only on the summits of the very loftiest mountains. I first met with this lichen on our own White Mountains, next on the far-off Fuegian mountain-peaks in sight of Cape Horn, and for the third time, on the lofty mountains on Hawaii: on examining the spores or seeds, these are found to be exceedingly minute, capable of

being transported by the winds to immense distances; but though dispersed, perhaps, over the whole globe, they sprout, are successfully developed only in the cold climate of the polar regions and of mountain-tops. Plants that produce large and heavy pea-like seeds, have a widely different area of diffusion.

Would, then, the creation of a single spore, a single grain of microscopic dust, have stocked the whole world with *Lecidea geographica?* To me, the cause seems adequate to the effect. Creative power has been exercised within smaller areas than the surface of an ocean islet, in the instance of cave-animals; the *Proteus* of a Carniolian cave, the blind *Coleopterous* insect of another European cave, and the blind *crustacean*, *fish*, and *Hemipterous* insect of a Kentucky cave, having proved each a peculiar species, confined to its own narrow dark subterranean abode.

Every species of animal and plant appears to have had an original home; a point from which its generations are continually pressing outwards, migrating as far as the means of support and the constitutional relation to climate permit, unless checked by some direct barrier.

Next after the alpine microscopic-seeded *Cryptogamia*, certain fluviatile aquatic and subaquatic plants, are regarded as having the most widely-disjoined areas of diffusion. But seeds formed for transportation in fresh water would endure transportation in sea-water, and borne by the currents of the ocean beyond the unfavorable belt of warm tropical countries, might obtain foothold in Antarctic territory. Even in these extreme instances, it is by no means necessary to suppose plurality of origin; that the same species was created in several distinct localities. Other instances of widely-disjoined area have been variously accounted for; so that the gradual disappearance of difficulties tends at least towards an ultimate result, an explanation by a single central home for each species.

Many animals are found to be diffused in proportion to their means of locomotion; the long-winged birds over larger areas than other birds. Man has diffused himself over the land-surface of the globe by the aid of art, by the invention of navigation. But, in general, among animals and plants, it is the embryo that governs in diffusion: whether the care of parents is required, or otherwise; whether the ova are perishable, or enduring; whether intended to remain on land and in the atmosphere, or in water; whether large or small, heavy or light,

sometimes provided with appendages for the very purpose of transportation by the winds; to say nothing of many other remarkable distinctions that on careful examination become manifest.

At one time, I thought of making the character of the embryo the basis of arrangement in the present work; but in confining myself to a record of facts personally observed, these led insensibly in a different direction, and one more descriptive; as contributions towards a mentally pictorial representation of the Earth's surface.

Several classes of animals and plants seem to require each a separate map to exhibit clearly their geographical distribution; but the accompanying four maps represent the principal variations, and may serve to illustrate the whole subject. Regions are marked out only where a centre of origin can be distinguished, and vary in relative importance; some regions containing numerous centres of origin, in other words, a multitude of peculiar species, each having its own geographical limits; whereas, on a general map, a single boundary line must be selected.

An instance of this inequality occurs in the map of Fluviatile animals; Madeira being colored as a separate region, although containing, as far as known, an *Ancylus* only, an exceedingly diminutive species of fresh-water shell, that seems peculiar. It is here necessary to distinguish Madeira from islands that do not possess fresh-water animals.

CHAPTER III.

EXPLANATION OF THE MAP OF THE GEOGRAPHICAL DISTRIBUTION OF PLANTS.

Plants, being attached to the soil, have not the power of locomotion; but by means of their seeds, transported by winds and waves, they traverse belts of ocean that are impassable to land quadrupeds. The genera and species of plants are exceedingly numerous; and the individual profusion thickly invests, covers indeed the land-surface of the globe, except only in comparatively limited Desert tracts. On the other hand, the species are restricted by the local variations in moistness of soil, and are influenced by climate more directly than land quadrupeds; so that more centres of diffusion are distinguishable, as will appear by comparing the maps.

Among land quadrupeds, five separate methods of adaptation are distinguishable in as many portions of the Earth's surface; but among plants, we are unable to point out any departure from one general plan, the modifications in structural organization very closely corresponding to the main divisions of climate. Yet certain genera, and even whole Families of genera, are confined within narrow geographical limits; and well-characterized clusters of regions may also be distinguished.

In the accompanying map, I have marked out eleven Divisions or clusters of regions, corresponding in general to the principal variations in climate; but some of these clusters deriving a distinctive character from geographical isolation.

I. The Polar and Alpine Adaptation.

Where the soil is chiefly or altogether watered by melting frosts and snow. Prevailing over eight distinct botanical regions.

1. The North Polar, or the Arctic Region. The most extensive of the icy regions, as it includes the whole territory within and in the neighborhood of the Arctic Circle, and from the Northern margin of both Continents is prolonged on mountain-summits into lower latitudes; on the Scandinavian Chain to mountain-summits in Scotland, on the Altaian Chain throughout, on the Rocky Mountains in America to the forty-fourth parallel of N. latitude, and to about the same limit on mountain-summits in New Hampshire and New York.

2. The European Alpine Region. Including the mountain-summits of the Pyrenees, of Switzerland, and of the Carpathians.

3. The Alpine Region of Taurus and Caucasus.

4. The Alpine Region of the Himalaya Mountains.

5. The Alpine Region of the Rocky Mountains. South of N. lat. 44°, and including, probably, the summits of the lofty mountain-peaks of the California margin of the great Interior Table-land.

6. The Alpine Region of the Peruvian Andes. Above the elevation of fourteen thousand feet to the perpetual snow; and extending Northward beyond the Equator nearly to the Caribbean Sea. In the absence of seasons, a climate of continually recurring frosts and snows; but not subject to severe cold.

7. The Alpine Region of the Chilian Andes. Commencing, probably, in Bolivia not far from the border of Peru, and extending Southward through the greater part of Chili.

8. The South Polar, or the Antarctic Region. Including all the territory within and in the neighborhood of the Antarctic Circle to the Falkland Islands, and extending beyond them on the mountain-tops of Terra del Fuego and the Araucanian Andes to the border of Chili.

II. The Wintry Regions of the Northern Hemisphere.

In all, twenty widely-scattered botanical regions. Colored green in the accompanying map.

9. The Forest Region of Northern Europe and the adjoining portion of Siberia. Including Scotland, and reappearing in Central Europe in some traces upon the mountains. Originally overspread with a forest, consisting in great part of spruces.

10. The Forest Region of East Siberia. Including the Kurile

Islands and the Southern extreme of Kamtschatka. An exact counterpart of the preceding region; and in like manner, principally covered with a forest of spruces.

11. The Mountain Summits of Atlas and of the Canary Islands. Including, probably, the summit of the Sierra Nevada in Spain, and of Pico Ruivo in Madeira.

12. The Summit of Mount Etna. Probably affording traces of a distinct botanical region; that may include the summit of Taygetus, and of other high mountains in Greece.

13. The most elevated Mountain Summits in the Sinai Peninsula. Described as affording traces of a distinct botanical region.

14. The Western or Bactrian Slope of the Himalayan Table-land.

15. The elevated main surface of the Himalayan Table-land, or the Region of Thibet.

16. The Southern or Nepaul Slope of the Himalayan Table-land.

17. The Eastern or Chinese Slope of the Himalayan Table-land.

18. The Mountain Region in Japan.

19. The most elevated Mountain Summits in Ceylon and Southern Hindostan.

20. The most elevated Mountain Summits in Sumatra and Java.

21. The most elevated Mountain Summits in the Philippine Islands and in Northern Borneo.

22. The lofty Mountain Summits in the Hawaiian Islands.

23. The Summits of the lofty mountains in Southern Mexico.

24. The most elevated Mountain Summits in Jamaica and Hayti. Possibly including mountain summits towards the Eastern end of Cuba. Presenting traces of a separate forest region in the trees and other woody plants, but probably containing very few peculiar species.

25. The Lower Mountain Region in California. On the flanks and perhaps the crest generally, of the snowy mountain-range that bounds the great Interior Table-land.

26. The Wooded Portion of Northwest America. Overspread with a forest of spruces, like Siberia and Northern Europe, but probably with less intermingling of other kinds of trees. Fertile natural openings of limited extent, are however frequent.

27. The Canadian Forest Region. A counterpart and continuation of the last-named Region; but occupied by an unbroken forest,

consisting mainly of spruces. Prolonged Southward in some slight traces upon the summits of the Alleghanies.

28. The Mountain Region of the Alleghanies. Commencing after some traces in Pennsylvania on the head-waters of the Potomac, and extending Southward so as to include the Alleghany ridges to their termination.

III. The Wintry Regions of the Southern Hemisphere.

In all, nineteen widely-scattered botanical regions. Colored green in the accompanying map.

29. The lofty Mountain Summits in Western Equatorial Africa. A little north of the Equator, and commencing upon the outlying Island of Fernando Po.

30. The Summit of Kilmungaro Mountain in Eastern Equatorial Africa. Situated a little South of the Equator, and sometimes visible from the Island of Zanzibar.

31. The lofty Mountain Summit in the Comoro Islands. Sufficiently elevated to be "sometimes seen ninety miles at sea."

32. The lofty Mountain Summits in the Islands of Bourbon and Mauritius.

33. The most elevated Mountain Summits in Austral Africa.

34. The ocean Islands of Tristan D'Acunha. Situated in the South Atlantic, at some distance from the Southern extreme of Africa.

35. The Prince Edward Islands and the Crozet Islands. A few widely scattered islets in the Southern portion of the Indian Ocean.

36. The Region of Kerguelen's or Desolation Island. Described as having a dreary and almost Antarctic climate.

37. The two ocean Islands of St. Paul and Amsterdam. Situated a little farther North in the Indian Ocean; but described as destitute of large trees.

38. The Region of Macquarie's Island, and of other ocean Islands to the Southward of Australia and New Zealand.

39. The lofty Mountain Summits in New Zealand.

40. The lofty Mountain Summit in Taheiti.

41. The Peruvian Paramera, or the cold pastoral Region of the Peruvian Andes. Above the limit of cultivation, and between the elevation of ten thousand feet and that of fourteen thousand feet.

Destitute of large shrubs, and thickly covered with low grasses; but with various humble plants here and there intermingled.

42. The Bolivian Paramera. Probably more arid than the Peruvian; for the stream flowing out of Chucuito Lake loses itself, and the Mountain of Potosi is described as many-tinted. The inversion of the order of aridity on the Andes is probably gradual, and in proceeding from Peru South, may commence in Bolivia.

43. The most elevated Summits of the Sierra Parime in Guiana. Situated far inland; one of them, seen by Humboldt, being "eight thousand five hundred feet" in height.

44. The most elevated Summits of the Organ Mountains in Southern Brazil. Some of these being above the elevation of seven thousand feet, present well-defined traces of a distinct botanical region.

45. The Mountain Region of Mendoza, on the Eastern Slope of the Chilian Andes. Probably for the most part, or altogether unwooded; as Cacti are said to be in great variety, and unusually abundant. Towards the Tropic, possibly continuous with the Bolivian Paramera.

46. The Mountain Region on the Western Slope of the Chilian Andes. From the elevation of six thousand feet to that of ten thousand, where visited by ourselves, in about S. lat. 33°; but towards the Tropic the Region may gradually ascend so as to be continuous with the Bolivian Paramera.

47. The Araucanian Forest Region. Confined to the Western side of the Andes, until in the far South the wooded portions of Terra del Fuego are reached and included.

IV. The Temperate Europeo-Asiatic Regions.

In all, sixteen botanical regions. Colored grey in the accompanying map.

48. The North Atlantic Island-Region. Exclusively European in its character, though confined to the distant ocean Islands, the Azores, Madeira, and the Canaries.

49. The Region of Middle Europe. From the Baltic and the 54th parallel of North latitude to the 43d, and from Ireland to the vicinity of the Black Sea. A region, in its original condition, overspread with

a nearly continuous forest. Fertile natural openings of limited extent being probably interspersed.

50. The Countries around the Western half of the Mediterranean. A botanical region bounded on the South by the Atlas Mountain-chain, and including Spain, Portugal, and Southern Italy, with perhaps the opposite shore of the Adriatic.

51. The Armeno-Caucasian Countries. Including Greece, Asia Minor, and the coast-portion of Syria.

52. The Mauritanian portion of the Great Desert. From the Atlantic Ocean to the vicinity of the Nile; and bounded on the North by the Atlas Mountain-chain, and in continuation thereof by the water-line of the Eastern Division of the Mediterranean.

53. The Egyptian and Syrian portion of the Great Desert. As far as the botanical Tropic, and extending Eastward throughout Northern Arabia to and beyond the Euphrates.

54. The Abyssinian Table-land. With its projecting mountain peaks.

55. The Yemen Table-land. A distinct botanical region from the preceding, although situated at such a short distance from it.

56. The Persian portion of the Great Desert. Described as in great part elevated and mountainous. Extending Eastward beyond the Indus into Northern Hindostan.

57. The Region of the Uralian Steppes. The unwooded middle portion of Eastern Europe and Western Siberia, including also the Turcoman portion of the Great Desert.

58. The Hyrcanian or Mazanderan Forest Region. The narrow fertile district of Ghilan and Mazanderan, interposed between the Southern margin of the Caspian and the mountain-chain of Taurus.

59. The Fertile portion of Kashgar; or of the Ara-tumen. A small but remarkable district in Central Asia, at the Eastern base of the Bolor continuation of the Himalayas. Cotton is said to be successfully cultivated in this locality at a point farther North than on any other part of the Globe.

60. The Region of the Mongolian Steppes. Including the extensive Desert tract in Middle Asia, and the unwooded portion of the basin of the river Amoor.

61. The Mandshurian Forest Region. Including Eastern Mandshuria, the main portion of Japan and of Corea, and the extreme Northern portion of China.

62. The Forest Region of Middle China. Bounded by N. lat. 27° and the Milin mountain-chain, which stretches from West to East in about the same parallel. The whole country originally overspread with a forest.

63. The Forest Region of Southern Japan. Including besides the extreme Southern portion of the Corean Peninsula. Both countries originally overspread with a forest.

V. The Temperate Regions in Northern America.

The plants almost everywhere exposed to the alternations of Summer and Winter; provision being made for a cessation of the vegetative process during the severe cold of a portion of the year. Thirteen botanical regions may be distinguished. Colored grey in the accompanying map.

64. The Region of North California. Principally unwooded; but with thickets and groves on the mountains, and along the banks of streams. Evergreen or perennial foliage predominating everywhere on the trees and shrubs.

65. The Region of Middle California. As far as the botanical Tropic, in about N. lat. 27°. Unwooded, and described as being more arid than the preceding region.

66. The Northern or Oregon portion of the Great Interior Table-land. Unwooded, and almost everywhere arid and grey; at no season tinged with refreshing green. The district that affords the most remarkable Oregon plants.

67. The Sonoran portion of the Great Interior Table-land. South of the preceding region, and extending to the botanical Tropic, in about N. lat. 27°. The face of the country described as decidedly more arid; with a predominance of spiny plants, as among others, *Acacia* bushes, *Cacti*, and a *Yucca*.

68. The Unwooded Region of the Missouri. In general grassy. Towards the Rocky Mountains extending Northward beyond the Saskatchawan and Athabasca rivers, where, according to Richardson, "it comes to a point in about N. lat. 57°."

69. The Unwooded Region of Arkansas and Texas. South of the preceding region, and of the thirty-fifth parallel of N. latitude.

70. The Forest Region of the Ohio. Extending Westward, in an

interrupted manner, two or three hundred miles beyond the Mississippi. Remarkable for the extreme rarity of Coniferous and other evergreen trees; the foliage of the forest being almost exclusively deciduous. The natural openings or "prairies" commence near the Southern extreme of Lake Erie; and continue to increase in size and frequency, until westward of the Mississippi the unwooded country predominates.

71. The Forest Region of the Middle States along the Atlantic. Extending Westward beyond the meridian of Niagara, so as to include the entire Northern portion of the Alleghany Mountain ridges. Originally covered by an unbroken forest, except only in certain limited tracts of marshy ground. Wherever the pine tribe is absent, the forest remarkable for the varied and brilliant tints of the falling autumnal foliage.

72. The Forest Region of the more Southern States. From the thirty-fifth parallel of N. latitude to the Mexican Gulf, and in the peninsula of Florida, according to N. A. Ward, to the twenty-seventh parallel of N. latitude. Mr. Ward also informed me, that a series of natural openings or "prairies" commences South of the Alleghanies on the Chattahoochee River, and extends in a line Westward to the open country beyond the Mississippi.

73. The Bermuda Islets. Amid a vegetable growth made up mainly of Carolina and West Indian plants, one or more species are said to be peculiar; if so, these islets present a trace of a distinct botanical region.

74. The Middle Mexican portion of the Great Interior Table-land. From the twenty-seventh parallel of N. latitude extending South as far as the twentieth parallel. Described as excessively arid, and almost rainless.

75. The Southern Extreme of the Great Interior Table-land. South of the preceding region and of the twentieth parallel of N. latitude. Hardly a true forest region; though regarded as "the most fertile portion of Mexico." Probably prolonged in some traces on mountain-summits in Guatimala or Central America.

76. The Mountain Region on the flanks of the Bogotan or Northern Andes. The flanks of the detached mountain of the Sierra de Santa Martha being included, and perhaps also the mountain-summit back of Caraccas.

VI. The Temperate Regions in Austral America.

In the absence of well-marked seasons, nowhere exposed to severe cold; the temperature decreasing gradually and regularly in receding from the Tropic. Eight botanical regions may be distinguished. Colored grey in the accompanying map.

77. The Mountain Region on the Western Slope of the Peruvian Andes. From the elevation of about five thousand feet to that of ten thousand; at least, in S. latitude 12°. A clearer sky than in Lower Peru, with occasional rains; but these are insufficient in quantity for the growth of a regular forest. Remarkable for the abundance and variety of *Calceolarias* and *Solanaceæ*.

78. The Mountain Region on the Western Slope of the Bolivian Andes.

79. The Mountain Region on the Eastern Slope of the Peruvian Andes. Exposed to more frequent rains than the two preceding regions, but said to be destitute of a continuous forest, and of large trees. The region of *Cinchonas* and of *Epidendric Orchidaceæ*.

80. The Mountain Region on the Eastern Slope of the Bolivian Andes. Probably more arid than the last-named region.

81. The Pampas or Unwooded Plains of Buenos Ayres and the Lower Parana. In coming from the country to the Southward, found by Darwin to be decidedly "green and grassy."

82. The Arid Plains of Patagonia. From S. latitude 39° to the Straits of Magellan. Hardly a true Desert, as the surface everywhere presents a scattered vegetable growth, adapted to the extreme aridity.

83. The Region of Lower Chili. Principally unwooded; presenting thickets, and shrubs more or less arborescent, but few or no large forest-trees.

84. The Island of Juan Fernandez. Clearly a distinct botanical region; though situated at no great distance from the Chilian coast.

VII. The Temperate Regions on and around New Zealand.

Not exposed to severe cold; the climate uniform and insular, devoid of well-marked seasons. Five botanical regions may be distinguished. Colored grey in the accompanying map.

85. The Region of Chatham Island. Situated far to the Eastward of New Zealand.

86. The Region of Auckland Island. Of limited area; but a distinct forest region, situated to the southward of New Zealand.

87. The Forest Region of New Zealand proper. The tract of forest much interrupted; but the openings all fern-covered, except where the ground is marshy.

88. The Kermandec or Sunday Islets. Situated to the Northeast of New Zealand, and possibly presenting a trace of a distinct botanical region.

89. The Region of Norfolk Island. Situated to the Northwest of New Zealand; of limited area, but known to contain several peculiar species of plants.

VIII. The Australian Adaptation.

The plants not exposed to severe cold; the climate continental and uniform; but in the absence of seasons, the rains infrequent and irregular, both as to time and quantity. As many as five botanical regions can be distinguished. Colored brown in the accompanying map.

Two of these regions are Tropical, and should perhaps be regarded as East Indian regions; but according to the descriptions of visitors, the Australian character dominates throughout in the vegetable growth.

90. The Region of Northeast Australia. A Tropical region.

91. The Region of Northwest Australia. A Tropical region; continuous with the preceding, but the climate described as more arid.

92. The Region of Southeast Australia. South of the botanical Tropic, which may be placed provisionally in the twenty-fourth parallel of S. latitude.

93. The Tasmannian Region. Including Tasmannia or the large island formerly called "Van Diemen's Land," and probably, the extreme Southern portion of Australia.

94. The Region of Southwest Australia. Perhaps confined to the extreme Southwestern portion of the continent. The intervening Interior space seeming sufficiently extensive for a sixth botanical region.

IX. The Temperate Regions in Austral Africa.

In the absence of seasons, the plants not exposed to severe cold; the climate uniform, but continental. At least three botanical regions can be distinguished. Colored grey in the accompanying map.

95. The Caffrarian or Natal Region. Including the extreme Eastern portion of Austral Africa, as far as the botanical Tropic, in perhaps the twenty-fourth parallel of S. latitude.

96. The Extreme Southern, or the Table-mountain Region. Perhaps including the whole Southern border of Austral Africa.

97. The Namaqua Region. The basin of the Gariep or Orange River, as far as the botanical Tropic, in perhaps the twenty-fourth parallel of S. latitude.

X. The Afro-Indian Adaptation.

Prevailing over a vast extent of Tropical territory, in a broad belt almost encircling the Globe. At least thirty-six botanical regions can be distinguished. Colored red in the accompanying map.

The six regions to be first mentioned form a separate subdivision; the climate throughout the year being decidedly warmer than on the remainder of the earth's surface.

98. The Region of the Cape Verd Islands. Unwooded, and exposed to occasional long-continued drought.

99. The Tropical Western, or the main African portion of the Great Desert. From the botanical Tropic, or the twenty-seventh parallel of N. latitude, to the sixteenth parallel, and from the Atlantic to the vicinity of the Nile.

100. The Nubian and Arabian portion of the Great Desert. Continuous with the preceding region, so as to include both shores of the Red Sea, and probably the principal part of Arabia.

101. The Somali portion of the Great Desert. South of the preceding region; and including East Africa as far as the Equator, also the Island of Socotra, and the Southern extreme of Arabia.

102. The Oman and Sinde portion of the Great Desert. Including Oman or Eastern Arabia, the opposite shore of Beloochistan, as far as the botanical Tropic, and extending Eastward to and beyond the mouths of the Indus.

103. The Region of Western and Central Hindostan. In great

part unwooded; and where the country is open and a little elevated, there is a continuation of the peculiar vegetable growth adapted to the increased grade of temperature.

104. The OCEAN ISLET OF ASCENSION, in the Atlantic. Known to possess one or more peculiar species of plants; and therefore presenting a trace of a distinct botanical region.

105. The OCEAN ISLET OF ST. HELENA. Known to possess several peculiar species of plants.

106. The FOREST REGION OF SENEGAMBIA AND GUINEA. The country more or less wooded between the Great Desert and the Gulf of Guinea.

107. The REGION OF SOUDAN, OR OF CENTRAL AFRICA. South of the Great Desert, and including the basin of the Upper Nile.

108. The FOREST REGION OF LOANGO AND CONGO, OR OF WESTERN EQUATORIAL AFRICA. The forest probably more continuous than in the two preceding regions.

109. The REGION OF BENGUELA. Described as arid, and in great part Desert.

110. The FOREST REGION OF ZANZIBAR, OR OF EASTERN EQUATORIAL AFRICA. Confined perhaps exclusively to the country South of the Equator.

111. The FOREST REGION OF MOZAMBIQUE AND SOFALA. South of the preceding region.

112. The MADAGASCAR FOREST REGION. Including the Comoro Group of islands.

113. The ISLANDS OF BOURBON AND MAURITIUS. A forest Region, known to afford a great variety of peculiar species.

114. The REGION OF THE SEYCHELLE ISLANDS. Of limited area, but known to contain a remarkable palm; probably not the only peculiar species of plant.

115. The FOREST REGION OF CEYLON AND SOUTHERN HINDOSTAN.

116. The FOREST REGION OF BENGAL AND BURMAH.

117. The FOREST REGION OF FORMOSA AND SOUTHERN CHINA. Including the adjoining portion of Anam or Cochin-China, and the Northern portion of Luzon.

118. The SIAM FOREST REGION. The Middle portion of the Indo-Chinese countries, between, perhaps, the seventeenth parallel of N. latitude and the fifth; including also the Andaman and Nicobar Groups of islands, and the Northern extreme of Sumatra.

119. The Equatorial Forest Region of Sumatra and Borneo. Including the intervening Southern extreme of the peninsula of Malacca, and also the island of Java.

120. The Mindanayan Forest Region. Including the whole Southern portion of the Philippine Islands, the scattered islets in and around the Sooloo Sea, and the extreme Northern portion of Borneo.

121. The Equatorial Forest Region of Celebes and the Molucca Islands. Including Gilolo and the Western peninsular portion of New Guinea, with possibly, the whole series of islands to the Southward, from Sumbawa to the Aroo Islands.

122. The Eastern and main portion of New Guinea. Including perhaps New Britain, New Ireland, the Louisiade, and the Solomon Group of islands.

123. The Island-Region of the New Hebrides and New Caledonia. Perhaps susceptible of subdivision, New Caledonia being described as "chiefly devoid of forests."

124. The Feejeean Island-Region. Including in the North, Rotuma, Hoorn Island, and Uea, and to the Southward and Eastward, the widely-scattered Tonga Group of islands. A region probably containing more than a thousand peculiar species of plants.

125. The Samoan Island-Region. Perhaps confined to the narrow limits of the Samoan or Navigator Group of islands: the climate there proving more rainy than that of any other part of the globe we visited. A region probably containing two or three hundred peculiar species of plants.

The coral-islands being excluded, as contributing to the distant diffusion of only a certain set of plants, species that are more or less submaritime, the remaining island-regions of the Pacific may be enumerated as follows:

126. The Taheitian Island-Region. Including the Hervey or Raratonga Group of islands. A region probably containing as many as two or three hundred peculiar species of plants.

127. The Region of Pitcairn's Island and the Gambier Group. Including other small volcanic islands in the vicinity, with perhaps the scattered Lapan Group, a little outside of the Tropic. Probably affording a few peculiar species of plants, or a trace of a botanical region distinct from the preceding. Some change in climate is manifest; Pitcairn's Island being exposed to occasional long-continued drought.

128. The Region of Easter Island and Salas. Two islands of limited area, and described as barren and destitute of trees. Probably presenting a trace of a distinct botanical region.

129. The Nukahivan Island-Region. Confined to the narrow limits of the Marquesas Group of islands.

130. The Island-Region of Banabe or Ascension, and Ualan. Two rocky islands, one of them within the border of the extensive coral-archipelago of the Carolines. Probably affording a few peculiar species of plants.

131. The Marian or Ladrone Island-Region. A group extending widely from North to South, but the islands in general small.

132. The Bonin Island-Region. A small detached group of islands; known to afford a trace of a distinct botanical region.

133. The Hawaiian Island-Region. Situated in the midst of the North Pacific, at a vast distance from any other coast or rocky island. Possessing many independent features, and affording not less than a thousand peculiar species of plants.

XI. The Tropical American Adaptation.

Prevailing over a comparatively limited portion of the broad encircling Tropical Zone. Seventeen botanical regions may be distinguished. Colored yellow in the accompanying map.

The two regions to be first mentioned are Desert-regions, shut out by the Andes and bearing little resemblance to the remainder of Tropical America in the climate and vegetable growth. They form, therefore, a distinct Subdivision, which may possibly include the Galapagos Islands.

134. The Desert-Region of Lower Peru. Extending along the Pacific from S. latitude 4° to the commencement of the Atacaman Desert. Notwithstanding the near vicinity to the Equator, the climate is temperate to perfection; the sky being very generally overcast, with frequent drizzle or heavy mist, but no real rain. The soil, except where bare, chiefly covered with *Tillandsias* and *Lichens*.

135. The Atacaman Desert-Region. A continuation of the preceding region, but described as more arid; perhaps, more like a real Desert than any other part of America. Plants, however, are said to spring up, when after a long interval of "twenty to twenty-five years, there is a deposition of moisture."

136. The Region of the Galapagos Islands. Described as properly unwooded, and as abounding in Cacti.

137. The warm arid region of Northwestern Mexico. From N. lat. 22° to 27°, and between the great Interior Table-land and the Sea. Described as almost a Desert-region, but the annual "rains bringing out some trace of vegetation." Including also the Southern Extreme of the California Peninsula, described as even more arid, with a "perpetually serene sky;" and said also to abound in *Cacti*.

138. The warm region of Eastern Mexico. Between the great Interior Table-land and the Mexican Gulf, and from N. lat. 27° to or perhaps beyond N. lat. 20°. Described as in great part arid and unwooded.

139. The Guatimalan Forest Region. Including Yucatan, and the narrow Southwestern portion of Mexico between the Table-land and the Pacific. Described by Hall, who visited it from the West, as richly wooded all along the Pacific.

140. The Caribbean or West Indian Island-Region. Including the Southern Extreme of Florida from the parallel of N. lat. 27°.

141. The Forest Region of Panama and Western Colombia. The country between the Gulf of Maracaybo and the Pacific, including the Panama Isthmus, and extending Southward along the Pacific to about S. lat. 4°. Described as thickly-wooded and extremely rainy, especially "between N. lat. 9° and S. lat. 3°," to which limit, according to Hall, "the wet weather predominates."

142. The extensive Llanos or Plains of the Orinoco. Described as savanna-like, nearly level, and almost entirely unwooded.

143. The Western portion of the great Equatorial Forest. Commencing in the profuse rains along the base of the Andes, and extending over the basin of the Amazon River, perhaps halfway to the coast; described as a heavy continuous forest throughout. The species of trees and plants seem very generally to differ from those growing nearer the Atlantic.

144. The Eastern portion of the great Equatorial Forest. Extending North of the Amazon River over Guiana, and as far as the Delta of the Orinoco. Described as everywhere a heavy unbroken forest.

145. The unwooded region of the Upper Parana, or of Tucuman and Paraguay. Trees are said to occur in Paraguay "only along the

banks of streams:" and Tucuman is described as "chiefly pastoral, but more hilly, with cultivation carried on in its valleys."

146. The EXTENSIVE UNWOODED PLAINS OF NORTHERN BRAZIL. From Pernambuco Westward, and including the Sertam, Goyaz, and Matto Grosso. Described as almost entirely pastoral, "wooded only upon the banks of the rivers."

147. The CATINGA DISTRICT OF CENTRAL BRAZIL. Interposed on the head-waters of the San Francisco, Tocantines, and Parana proper; and described as "extensive and somewhat elevated open plains, with frequent hollows and narrow valleys where the trees become more flourishing and form matted woods." The foliage of these woods is further described as periodically deciduous; a winter of drought serving the same purpose here as a winter of cold in the North.

148. The FOREST REGION OF SOUTHERN BRAZIL. An unbroken forest along the Atlantic from Bahia to St. Catherine's, or from S. lat. 13° to a little beyond S. lat. 27°, and extending over the whole range of the Organ Mountains, but not much farther inland. In richness and variety of vegetable productions, exceeding any other part of the globe I have visited.

149. The TWO OCEAN ISLETS OF TRINIDAD AND MARTIN VAS. Situated in the Atlantic, to the Eastward of Rio Janeiro. Possibly affording a trace of a distinct botanical region.

150? The OCEAN ISLET OF FERNANDO NORONHA. Situated in the Atlantic, not far from the Equator. The geographical position indicates the possible presence of a peculiar species of plant: the islet, however, may be too small to afford any vegetable growth.

CHAPTER IV.

BRAZILIAN REGIONS.

The Vincennes, accompanied at first by the other vessels of the squadron, left the shores of the United States on the 19th of August, A. D. 1838: and after sailing through the Azores Group of islands, and visiting Madeira and the Cape Verd Islands, arrived on the 22d of November in sight of Cape Frio, and on the 23d entered the spacious harbor of Rio Janeiro.

I. Southern Brazil.

The environs of Rio Janeiro have been much celebrated for the beauty of the scenery. The country is full of steep cone-like hills, one to two thousand feet high, round-topped, and often presenting on their sides inaccessible smoothly-swelling surfaces of bare rock. So steeply sloping are some of the lofty promontories that jut out into the sea, that it is impossible to walk along the shore around their base.

In accordance with the configuration, the country proved to be exclusively *granitic:* and to the limit of my excursions, some fifty miles inland, the granite was found to be normal and singularly uniform in its composition; the only extraneous minerals met with being a few small garnets. A further proof of the great extent of this granitic formation is found in the fact, that the supply of lime for the city is procured by dredging marine shells, chiefly univalves, from the bottom of the Bay.

We had arrived at the "commencement of the hot season;" also called the "rainy season," rains being "somewhat more frequent than during the remainder of the year;" but from various circumstances

and direct testimony, there seems hardly a distinction of seasons in this part of Brazil. Flowers and fruit were usually seen side by side upon branches of the same plant; but during our six weeks' stay, we witnessed something of the successive dominance of different kinds of showy flowers, spoken of by residents. In the trees generally, so far as I had the opportunity of examining, the annual concentric rings of growth were hardly if at all distinguishable; showing that the vegetative process is never periodically checked.

On entering the woods, the most striking point of difference from the North is, that the forest-trees bear gaudy flowers, various in hue according to their kinds, but over all the rest yellow predominating. In the distance, yellow alone was conspicuous, covering tree-tops, as those of *Lecythis*, *Cæsalpinia*, *Vochysia*, and *Cassia;* and lower down, profusely intermingled on the shrubs and woody vines, from the great abundance of *Bignonias* and *Malpighiaceæ*. The foliage is everywhere perennial, not so freshly green as our spring foliage in the North; nor with the season losing its freshness; but throughout the year maintaining a sober aspect of perpetual youth.

From the first, Mr. Brackenridge remarked the absence of "social plants," of stocks of the same species growing in beds and patches. The plants were all growing separately, each stock surrounded and entangled among other plants of the most diverse affinities; and every new locality presenting species not before met with. Such was the intermingling at every turn, that in the whole course of my experience in different parts of the globe, only in Brazil was I unable to point out prevailing species of plants.

It is true, the local circumstances favor the presence of the greatest variety of species within a given space. The face of the country is broken into mountains of inferior elevation, and abounds in inaccessible spots, any one of which may afford a species extremely rare elsewhere. There is besides great uniformity in the leaves; and the plants being mostly woody, the eye of the observer is usually below the objects of his search. Certain kinds of trees and woody vines come into flower only after an interval of several years, and then perhaps are by no means conspicuous. So that in view of these and other considerations, the environs of Rio Janeiro may long continue to afford accessions to the known species of plants.

For some miles around the city, the modifying hand of man is everywhere manifest, and if at first the woods seemed entirely wild,

the original large trees had been culled out. It was only on reaching the Organ Mountains, unrivalled in the magnificent combination of rock and forest scenery, that we entered any portion of the "matto virgem" or primeval forest.

So far as examined by ourselves, the PRIMEVAL FOREST could be traversed in every direction, and was very little encumbered with vines and thickets: even fallen timber was seldom met with, except on the unfrequented mountain-peak overlooking the Piedade road. The trees, usually slender-stemmed, rise forty to sixty and seventy feet before giving out their branches, which are upward-tending until at length they spread into an umbrella-shaped summit, with the foliage everywhere far out of reach. The lowest limb of one slender flexuous-stemmed *Cecropia* was observed to be full a hundred feet from the ground. When therefore, the difficulty is considered of discriminating between leaves eighty or a hundred feet aloft, the flowers, if present, being above and concealed from the observer, it will not appear surprising, that the composition of the Brazilian forest should remain in great part unascertained. Add to this the immense variety, there being probably more kinds of trees within forty miles of Rio Janeiro, than beyond the Northern Tropic on a full half of the land surface of the Globe. In short, a good idea of the state of things may be obtained from the fact, that a shot-gun for shooting down branchlets, and a spy-glass to assist the eye, are indispensable in Brazil to success in botanical pursuits.

In clearings, where the forest has been cut away, a *reedy grass*, creeping and more or less scandent, soon gets possession; its long and strong stems tangling together the undergrowth to the great inconvenience of the traveller.

In a Tropical country known to abound in *Palms*, I was surprised at seeing nothing of them in the distant landscape; the species growing in this part of Brazil being all comparatively humble, and overtopped and concealed in the surrounding forest.

The most striking objects in the landscape were two species of gigantic reeds or *bamboos;* brittle and weak-stemmed, in ascending supported by giving out spreading whorls of branchlets, and at length towering high above the tree-tops, like enormous nodding plumes here and there in the distance waving over the forest.

In all situations, whether in the primeval forest or among woods of secondary growth, entire leaves, more or less smooth and coriaceous,

were observed to predominate. Coarsely-pinnated leaves were here and there met with; but the delicate feathery foliage of the *Acacia* tribe proved extremely rare. Plants of the most diverse and unexpected affinity were met with woody-stemmed, according to the species forming vines, shrubs, or trees. Remarkable differences from the forest of Northern climates were found in the trunks of certain kinds of large trees being armed with stout prickles; in the thin board-like buttresses widely-projecting at the base of a lofty species of *Ficus;* and in the growing leaves of plants being sometimes coated, in moist shady places, with mosses and lichens.

I met with but a single example of a *climbing tree;* that is, of a vine whose trunk enlarging with age becomes tree-like, maintaining, however, the inclined position, in contact with its original support. Lofty-climbing vines, passing from one tree-top to another, were very seldom seen; yet the scandent *Bauhinias* were not altogether absent; and a ribbon-shaped undulated woody stem was also met with, perhaps belonging to this genus. In one instance, a stout woody vine had formed a network of coils around a slender tree, as though strangling it, having in the meantime acquired sufficient rigidity to be self-supporting. *Woody vines* of more humble growth were in vast variety; abounding, like the *shrubs*, chiefly on the border of woods and in other situations exposed to the sun.

The display of *epidendric plants* in the Brazilian forest is very striking; and especially, the *Bromelias* in great variety, together with the *Tillandsias*, and the less frequent epidendric *Cactaceæ*. Epidendric *Ferns*, as in many other Tropical countries, were in profusion, and occasionally *Peperomias* were intermingled; but epidendric *Orchidaceæ* seemed comparatively rare, though possibly in greater abundance high up and out of sight in the tree-tops. Genuine epidendric *Araceæ* were also met with; and in one instance the "cipo d'imbé,"—long cord-like radicles hanging nearly to the ground and supposed "to belong to an Araceous plant," but their origin among the tree-tops proved too distant to be traced out by the eye. In general, it was observed, that the rough-barked and oldest trees were most encumbered with epidendric plants; while among other smooth-barked trees, the Cecropias seemed entirely free from their lodgements.

Of plants growing on the ground, true *annuals* were hardly to be met with; the *Cyperaceæ*, *grasses*, and *ferns* were in general normal; but of other *herbaceous plants*, many were strangely unlike those of

Northern climates: As, in the deepest shade of the primeval forest, the tenderly-herbaceous *Dorstenias* and *Begonias:* in drier situations in the forest, the humble *Tradescantia fuscata*, remarkable for its broad bi-colored leaves, reddish beneath: investing the basal portion of the trunks of forest-trees, the twining *Araceæ*, with their smooth leaves of pleasant unchanging green in fine contrast with their snow-white flowers: also the *Vanilla*, a climbing *Orchideous* plant: in moist sunlit situations, as on the banks of streams, various *Scitaminaceæ*, tall and showy, intermingled with a *Musaceous* plant, the *Heliconia*, so conspicuous from its large scarlet ancipital flower-bracts: in other situations, the *Bambuseæ*, already noticed: *Bromelias* of different kinds, as frequent on the ground as on the trunks of trees: one or more species of *Crinum*, huge bulbous-rooted plants, abounding in brackish marshes: the *Cactaceæ*, confined chiefly to exposed rocky situations along the sea-coast: the *Gesneriaceæ*, bearing ornamental flowers and chiefly growing on rocks: and the *Passifloras*, climbing, herbaceous vines, everywhere abundant in somewhat open situations.

But of all the productions of Brazil, none excited astonishment so much as the *Furcræa*, tenderly-herbaceous in all its parts, but of colossal dimensions; the flower-stem sometimes nine inches in diameter, and arising forty feet in height out of a chevaux-de-frise of enormous bayonet-shaped leaves, that would block a carriage-road or the intersection of four city-streets.

Negative Characters. The Furcræa takes the place of the less gigantic Agaves of the other parts of Tropical America. In other Tribes of plants, many similar substitutions of genus were remarked; and notwithstanding the great sameness in climate, the species in almost every instance proved distinct from those known to inhabit Guiana and the country North of the Equator.

In visiting different countries I have often been first struck with the absence of certain Tribes of plants; as strongly characterizing the vegetable growth as the unlooked-for presence of other Tribes. After excluding all species introduced by the hand of man, and the distinct botanical region on the higher summits of the Organ Mountains, the following Tribes of plants were not met with in our rambles in Southern Brazil:

Ranunculaceæ,
Magnoliaceæ,
Berberidaceæ,
Papaveraceæ, none at least in the indigenous state,
Fumariaceæ,
Cruciferæ, none at least in their indigenous state,
Resedaceæ,
The Bixa Orellana in its indigenous state,
Droseraceæ,
Cistaceæ,
The Chorisia ventricosa,
Ternstroemiaceæ,
Aurantiaceæ,
Malpighieae proper, those with stinging hairs and berried fruit,
Hippocastanaceæ,
Aceraceæ,
Linaceæ,
Geraniaceæ,
Balsaminaceæ,
Tropæolaceæ,
The pinnate-leaved species of Oxalis,
Pittosporaceæ,
Celastraceæ (at least none recollected at the close of our visit),
Rhamnaceæ (none recollected at the close of our visit, not even the genus Gouania),
Homaliaceæ,
Moringaceæ,
The genus Hymenæa,
The Tribe Chrysobalaneæ,
Memecylaceæ,
The yellow-flowered Melastomaceæ,
The micropetalous and apetalous Myrtaceæ,
Paronychiaceæ (none recollected at the close of our visit),
Ficoidaceæ,
Grossulariaceæ,
Saxifragaceæ,
Escalloniaceæ,
Hamamelidaceæ,
Caprifoliaceæ,
Cornaceæ,
The Hamelia patens,
Valerianaceæ,
Dipsaceæ,
The Tribe Cichoreæ,
The Tribe Cynareæ,
The genus Gnaphalium,
The genus Senecio (no species recollected at the close of our visit),
Campanulaceæ,
Vacciniaceæ, (a Gaylussacia however said to occur along the coast to the Eastward),
Ericaceæ,
Pyrolaceæ,
Monotropaceæ,
The genus Chrysophyllum,
Apocyneous trees,
The genus Plumeria,
The genus Asclepias, (the A. Curassavica seeming merely naturalized),
The purple-flowered species of tree Bignonia,
Polemoniaceæ,
Hydrophyllaceæ,
Hydroleaceæ,
The genus Cordia,
The Tribe Borrageæ or Myosoteæ,
The genus Vitex,
The genus Cytharexylon,
The genus Duranta,
Orobanchaceæ,
The genus Triplaris,
The Coccoloba uvifera,
Myristicaceæ,
Proteaceæ,
Thymeleaceæ,
Santalaceæ,
Elæagnaceæ,
Atherospermaceæ,
The herbaceous species of Urtica,
Amentaceæ,
Coniferæ, (except on the flanks of the Organ Mountains),
Cycadaceæ,
The Pistia stratiotes,
The genus Musa,
The genus Dracæna,
Hæmodoraceæ,

Anthericaceæ,
The Allium Tribe, or the Scilleæ,
Melanthaceæ,
The genus Agave,
The twining species of Tillandsia,
Juncaginaceæ,
Eriocaulaceæ,
Restiaceæ,
The Cocos nucifera in its indigenous state,
The flabellate-fronded Palmaceæ,
Equisetaceæ (none recollected at the close of our visit).

Contrary to all expectation, the following Tribes of plants proved rare: *Dilleniaceæ*, represented solely by *Davilla rugosa*; *Menispermaceæ*, rare and inconspicuous, three or four species only being met with; *Capparidaceæ*, with the exception of a submaritime species of *Capparis*, seldom met with in the indigenous growth; *Malvaceæ*, with the exception of the doubtfully indigenous *Sidas* and the maritime *Paritium*, decidedly rare, and the species met with presenting very little beauty; *Mimoseæ*, species with delicately-pinnate feathery foliage hardly to be met with; *Cucurbitaceæ*, the few species met with being also inconspicuous whether in flower or in fruit; *Crassulaceæ*, represented solely by the *Kalanchoe Brasiliensis*, and this hardly having the aspect of an indigenous plant; *Umbelliferæ*, not, however, rarer than in most Tropical Climates; *Loranthaceæ*, met with in a few instances, but far less prominent than we anticipated; the Tribe *Heliantheæ*, almost entirely wanting; *Oleaceæ*, represented solely by a white-flowered *Jasminum*, which seemed to be indigenous; large Apocyneous shrubs, the whole family of *Apocynaceæ* being somewhat rare for a wooded district in a Tropical Climate; *Asclepiadeæ*, decidedly rare; *Convolvulaceæ*, with the exception of the two maritime species, rare in the indigenous vegetable growth, (in striking contrast with the state of things known to prevail on the opposite African coast); *Acanthaceæ*, rare, especially when compared with Intertropical Africa and Asia; *Amaranthaceæ*, except on the sea-coast, somewhat rare; *Chenopodaceæ*, represented solely by the *Salicornia* of the sea-coast; *Lauraceæ*, very seldom met with; *Asaraceæ*, and even the genus *Aristolochia*, decidedly rare; the ground species of *Orchidaceæ*, rare; *Liliaceæ*, represented solely by an *Alstroemeria*, a plant perhaps belonging properly to the mountain-region; *Dioscoreaceæ*, two or three species only met with; and *Juncaceæ*, represented solely by an articulated species of *Juncus* observed growing in a single locality.

The vegetable growth is, therefore, especially characterized by the absence of Agaves, Cycadaceæ, flabellate-fronded Palms, Apocyneous trees, Myristicaceæ, and micropetalous long-stamened Myrtaceæ; and by the rarity of Capparidaceæ, Malvaceæ, Convolvulaceæ, and Acan-

thaceæ. Having thus disposed of the negative character of the vegetable growth, we are prepared for an account of what meets the eye of the observer.

Composition of the vegetable growth. Probably, in no other part of America, or of the globe, is there such a variety and abundance of *Melastomaceæ* and *Bromeliaceæ* as in the country around Rio Janeiro. These are the dominant and characteristic Tribes; but on more thorough examination, two-thirds of the mass of vegetable growth seemed made up of six Families of plants, in nearly equal proportions, yet occurring in the following order of frequency:

1. *Filices*, or ferns. As in many other luxuriant forest regions, ferns were everywhere conspicuous, on the trunks and branches of trees, on the ground beneath within their shade, also in sunlit openings, and on exposed precipitous rocks. Tree-ferns, ornamental and of palm-like outline, were frequent in the forest, and in considerable variety; but the species all of moderate height, in no instance exceeding twenty feet; one species, growing twelve feet high, had the trunk unusually stout for this Tribe of plants, being exactly double the size of the human body.

2. *Melastomaceæ*. In the present condition of the country, changed by the removal in great part of the primeval forest, the Melastomaceæ have become almost as abundant as the ferns. The species are very generally shrubs, thriving under exposure to the sun and to moisture, so that swampy places are filled with them; the display at the same time of showy purple flowers having procured for them the expressive though in some respects objectionable name of "Rhododendrons." Two or three of the species formed trees of medium size, forty to fifty feet high; the largest one seen having with a spreading summit the trunk full two feet in diameter. Herbaceous species were rare, but not altogether wanting. In all, some forty species of Melastomaceæ were met with, belonging to several genera, and differing very much in the size and showiness of the flowers: these were observed to be invariably purple, more or less deep, according to the species, and varying besides in tint; in some species inclining to blue, in others rose-colored, and in others again so pale as hardly to be distinguishable from white. The berries of certain species were found to be edible, and although insipid, in the absence of all other kinds of fruit in the Brazilian forest, proved refreshing.

3. *Rubiaceæ*. Of diversified aspect, according to the genera, and

extremely abundant; especially, certain shrubs, growing in the shade and around the margin of the forest, as *Chiococca*, *Psychotria*, *Palicourea*, *Cephaelis*, *Faramea*, *Exostemma*, and others. Many of the species were ornamental; some from their flowers, others from their expanding colored calyces, others from their sanguineous branching peduncles, others from their foliage, and others again from the brilliant hue of their ripe fruit. One species presented a mode of growth with which I afterwards became familiar in moist Tropical woods; a shrub, at least in its slender stem, which is simple and perfectly upright for twenty feet or more, and terminates in a palm-like crown of large leaves, each of them nearly a yard in length; or in instances where one or two branches are given out, these keep close together perfectly upright, and each terminates in a separate crown of leaves. Only one example of a Rubiaceous tree was met with, a *Genipa*, forty feet high, with a spreading summit; in the foliage and large fruit resembling and at first mistaken for a tree of the Clusia Tribe. Humble herbaceous Rubiaceæ were frequent in long-established clearings; and twining species were also met with, some herbaceous and others woody. Throughout the Family there was much variety in the color of the flowers, but most of the genera met with were observed to be white-flowered.

4. *Myrtaceæ*. In very great variety; some of them shrubs more or less arborescent, and others lofty trees entering largely into the composition of the forest. One of these forest-trees was observed to bear flowers not at the ends of the branches, but on the bark of the trunk. A roundish-leaved *Calyptranthes?*, growing along the sea-coast, proved remarkable for the brittleness of its leaves and other herbaceous parts, the flowers, too, falling at the slightest touch. A delicate shrubby *Myrtus ?* was observed to have its small leaves all directed obliquely in the same plane, a very striking character in a living plant. But throughout the Brazilian Myrtaceæ the flowers were observed to be normal, and in almost every instance white; none of them presenting the slightest approach to the apetalous and micropetalous long-stamened set of species found in Australia and the surrounding countries.

5. *Glumaceæ*, including grasses or Gramineous plants and the Cyperaceæ. The reedy *Bambuseæ* have been already noticed: and some of the normal grasses were observed to imitate them in habit, ascending among bushes by giving out successive spreading whorls of stem-like branches; one of the results of the vegetative process

being never interrupted. In established clearings, grasses have become abundant, as *Paspalums* and *Panicums*, in their general aspect presenting nothing unusual. Various fresh-water marshes were almost exclusively occupied by different species of *Cyperus;* all bearing a general resemblance to those growing in Northern Climates. A species of *Papyrus*, subaquatic and of large size, was seen in one locality; and near at hand, a weak-stemmed slender *Scleria*, ascending full thirty feet among the branches of trees.

6. *Bromeliaceæ.* The splendid *Bromelias* were in vast variety and abundance; herbaceous plants, rendered conspicuous by a unique and striking aspect, strangely diversified according to the species, and by the brilliant tints of their floral leaves. Many of the species were growing indiscriminately on the trunks and branches of trees, on rocks, and on the ground. Other species, some of them of almost giant size, seemed confined to trees, lifted high aloft upon the branches, or crowding on the trunks: other species formed the undergrowth in the deepest and wettest portions of the forest: and others again, covered projecting sunny rocks and the exposed banks fronting the sea. Besides the floral leaves, more or less colored, the flowers in many species are showy and ornamental, presenting an unusual variety of hue, red, yellow, rose-colored, or blue, according to the species. In short, it would be impossible to convey a just idea of the aspect of the Brazilian Bromelias, without colored plates of the largest size.—On the other hand, the *Tillandsias* proved strictly epidendric, growing exclusively on the trunks and branches of trees; and though less conspicuous than the Bromelias, were abundant and in very considerable variety, all of them more or less hoary, and many of the species having ornamental flowers.

Next in abundance after the above six Families of plants, were thirteen other Families that seemed intermingled in the following order of frequency:

7. *Leguminosæ.* Comparatively less abundant perhaps than in most countries, and presenting no very marked peculiarities. Consisting of various well-known genera of trees, shrubs, herbaceous plants, and vines, many of them bearing ornamental flowers. A purple-flowered *Erythrina*, a small tree, was growing in various localities; and the young plant of another species proved remarkable for the size of its leaves, the terminal leaflet measuring eighteen inches in its longest diameter. The lofty *Cæsalpinia*, conspicuous in the distant forest from

being mantled with yellow flowers, has been already mentioned; and two or three other kinds of Leguminous trees were met with. Of lofty climbing vines, besides the infrequent *Bauhinias*, a species of *Mucuna* was detected by its racemes of flowers, that were swaying at the end of long string-like peduncles, traceable for six feet or more until lost among the interlaced branches of forest-trees. Of herbaceous vines, species were observed of *Rhynchosia*, *Phaseolus*, *Dolichos*, *Galactia*, and *Clitoria*. And of humble plants, more or less herbaceous, species of *Desmodium*, of *Crotalaria* (all of them yellow-flowered), *Zornia*, *Stylosanthes;* and in the marshes, *Æschynomene*.

8. *Urticaceæ*. A species of *Cecropia*, regarded as one of the largest and most remarkable trees of the Brazilian forest, was conspicuous on the Organ Mountains, from its smooth bark and the white under-surface of the leaves, readily mistaken in the distance for flowers. The species of *Ficus* were unusually numerous for America, and were all trees, several of them of the largest size. Species of *Celtideæ* were also frequent, forming shrubs more or less arborescent, and small trees: but especially, there was a great variety of large shrubs closely allied to *Urtica*, that abounded in cool shady situations, more particularly beyond the Organ Mountains. Of humble species of Urticaceæ, the only ones met with were the tenderly herbaceous *Dorstenias*, growing as already stated in moist places in the deepest shade, along the banks of mountain-rills.

9. *Solanaceæ*. The largest species met with was a *Solanum*, a tree twenty-five feet high with the trunk seven inches in diameter. Other species of *Solanum* were abundant and in great variety, most of them rank-growing thick-stemmed shrubs, with coarse foliage and often showy flowers; but some of the rank-growing species proved herbaceous. Many-stemmed shrubs, belonging to *Solandra*, *Cestrum*, and other similar genera, were abundant; and with the Solanaceæ in general, seemed chiefly confined to partially cleared situations, as along the sides of roads opened through the forest.

10. *Euphorbiaceæ*. Holding the tenth place from the abundance of coarse-leaved Amaranthiform species of *Croton*, growing, many of them arborescent, in partially cleared situations: the largest Euphorbiaceous tree met with was a large-leaved species of Croton, spreading, and in one instance forty feet high with the trunk a foot in diameter. Climbing Euphorbiaceæ were also met with, as the *Dalechampia*, a herbaceous Passiflora-like vine; and two *Tragias*, also herbaceous vines.

11. *Compositæ.* Comparatively rare, as in many other luxuriant Tropical forest-regions; and the species in general not ornamental. The *Albertinia* formed a small tree; and of the remaining Compositæ, many were shrubs, more or less arborescent; the most frequent, being perhaps, the species of *Baccharis* and *Eupatorium.* Of climbing Compositæ, the *Heterocoma*, a woody vine, was at once recognized by its large flowers, sessile among the leaves, which occur only at intervals; two or three *Mikanias*, herbaceous vines, were also occasionally met with. Of the humble weedy Compositæ growing in long-established clearings, some of the species seemed indigenous.

12. *Malpighiaceæ.* Eminently characteristic, from being in sunny situations frequent and conspicuous; chiefly consisting of woody vines with showy yellow flowers, *Banisterias*, *Heteropteris*, *Tetrapteris;* and of one herbaceous vine, the *Stigmaphyllon*, remarkable in its Tribe for having Vitis-like foliage. Of upright Malpighiaceous shrubs, one species only was met with, the *Byrsonima*, growing along the sea-coast.

13. *Piperaceæ.* Holding the thirteenth place from the numerous species of *Piper;* large shrubs, many of them twelve to fifteen feet high, principally abounding in cool shady situations. The species hardly seemed congeneric with the Pipers of the Eastern Continent; their general aspect, and in many instances their leaves being more like those of Urticaceous plants. One frequent species, differing widely from the others in habit, bore large Arum-like leaves, and a very long ament or spike.—On the other hand, the *Peperomias* were strikingly similar to those seen afterwards in other Tropical countries; being tenderly herbaceous, small and inconspicuous; chiefly epidendric on the trunks and branches of trees, but sometimes growing equally on exposed rocks.

14. *Verbenaceæ.* Holding the fourteenth place from the abundance of *Lantanas;* mostly shrubs, six to twelve feet high, growing in sunny situations, their flowers ornamental and differing in color, in some species orange, in others purple, and in others again white. One herbaceous species of Lantana was also met with. The character of the foliage led me to suspect, that some of the forest-trees might prove Verbenaceous, but I could obtain no direct evidence.

15. *Begoniaceæ.* Herbaceous plants of singular aspect, abounding in moist dripping woods; in situations where the sunlight is let in, and some of the species growing in the deepest shade.

16. *Terebinthaceæ.* Trees and shrubs having pinnate leaves that

resembled those of the Terebinthaceæ, abounded in the forest: but amid the variety of genera, some probably belonged to other Tribes of plants known to have very similar pinnate leaves.

17. *Palmaceæ.* Mountain-summits were often found occupied by a growth of Bromelias and Bambuseæ, intermingled with different species of slender-stemmed dwarf Palms: while in other situations, Palms usually occurred singly and at long intervals. Of sixteen species observed, one exceeded the height of forty feet; three or four attained that of thirty; and the remaining species were comparatively humble, though with their spreading fronds occupying a good deal of space. In all instances, the fronds were observed to be pinnately-divided; the only variations being, in the eroded Caryota-like segments in certain genera, and in the fronds of young Palms remaining entire from the non-separation of the segments. A climbing Palm was also met with; the stem slender and vine-like, ascending by reflexed spines on the tendril-like prolongation of the midrib of the fronds.

18. *Sapindaceæ.* Some of the forest-trees seemed to belong to this family; and among shrubs, a species of *Sapindus* was frequent. The *Paullinieæ* were abundant and conspicuous; woody vines, ornamental not from their flowers, but from their foliage, their peculiarly-divided compound leaves.

19. *Araceæ.* The most abundant were the twining species, around the basal portion of the trunks of forest-trees; varying greatly in leaf and flower according to the species, and notwithstanding their simple array of green and white, presenting a fine subject for an illustrated monograph. Among the rest, the *Monstera pertusa*, recognized by the natural perforations in the leaves, proved by no means rare. The *Caladium hederaceum*, so remarkable for its upright and even woody stem, six feet or more in height, was growing in profusion on cliffs facing the sea: and a *Colocasia* having leaves three feet by two, or larger than in any other species I have met with, was frequent on the Organ Mountains. A stemless genus, allied to Pothos, and having an elongated dark-colored spathe, was usually epidendric on the trunks and branches of trees, but was sometimes seen growing on the ground. Another very singular Araceous genus had the leaves stout and inflexible, oblong-lanceolate, three to four feet in length, and projecting obliquely upwards, conspicuous along the cliffs of the sea-coast.

Next in frequency after the above nineteen Families of plants, were

the following eleven Families:—*Bignoniaceæ*, in very great variety; chiefly luxuriant woody vines, conspicuous in all directions from their foliage and large showy flowers, purple, yellow, or white, according to the species.—*Guttiferæ*, represented by a *Clusia*, growing along the sea-coast, and by a few other fine ornamental trees of medium size.—*Meliaceæ*, consisting of *Guarea* and other trees of the largest size, whose presence was indicated by their fallen flowers in the forest; and of various shrubs, more or less arborescent: the flowers of all the Meliaceous genera met with were white, or at most having a tinge of green.—*Passifloraceæ*, abundant and various, and though admired in our Northern green-houses, so lost amid the luxuriance of the Brazilian forest growth, as to be generally looked upon as mere weedy vines.—*Scitaminaceæ*, most of the species tall and showy, and frequent in moist situations; one species, observed on the banks of the Rio Piabanha, being full sixteen feet high; the *Calathea Zebrina*, or "velvet plant," was met with in the environs of Rio Janeiro, to all appearance indigenous in the forest.—*Cactaceæ*, a Tribe requiring exposure to the sun and air, were chiefly represented in the Interior by epidendric kinds, species of *Epiphyllum* and *Rhipsalis;* some of these were growing equally on exposed rocks; while in more than one instance I observed the long, branching, unsightly stems of a *Cereus* fairly epidendric, and swinging in the air from a tree-top.—*Gesneriaceæ*, herbaceous thick-stemmed plants, with coarse rugous foliage, and according to the species, more or less exclusively confined to rocks; to which situation they seemed specially adapted by the swollen tuberous base of the stem; the flowers, more or less ornamental, were observed to be usually red, but in a few species yellowish or greenish.—*Apocynaceæ*, including one large shrub, with ornamental foliage and white Nerium-like flowers; also a variety of *Echites*-like woody vines, many of them ornamental.—*Rutaceæ*, including species of *Almeidea;* and also of *Zanthoxylum*, and other genera not yet separated from this Family—*Tournefortieæ*, in very considerable variety; one of the species being a climbing shrub, and another a small tree with brittle leaves.—*Commelinaceæ*, herbaceous and of humble stature, but several of the species rendered conspicuous by bright-colored flowers; or in the exceptional instance of the *Tradescantia fuscata*, by the reddish under-surface of the leaves.

There yet remain Tribes of plants, some of them occurring abun-

dantly, and others affording remarkable species that seem to require special notice:—*Sapotaceæ*, shown by the frequency of their fallen seeds to be lofty trees, intermingled in the primeval forest; where also other lofty trees were found to belong to *Araliaceæ;* and where the large flowers of *Gustavia* were strewing the ground beneath a tree of the largest size.—A *Lecythis*, a tree exceeding the medium size, in various localities rendered conspicuous by its showy yellow flowers: and a *Vochysia*, though a small tree, recognized at a long distance by its rich yellow spikes of flowers.—*Anonaceæ*, in some variety, none of the species exceeding the dimensions of a small tree.—Of *Hypericaceæ*, a *Vismia*, forming a small tree, was repeatedly met with.—Of *Polygalaceæ*, a tree *Polygala*, thirty feet high, with the trunk nine inches in diameter; another species of *Polygala*, forming a large-leaved shrub: a *Securidaca*, forming a shrub; another species, a woody vine; and a *Trigonia*, also a woody vine.—Of *Violaceæ*, a species of *Calyptrion*, forming a woody vine.—Of *Oxalidaceæ*, several species of *Oxalis* that formed shrubs, three to five feet high, with much of the aspect of Desmodiums; and one species, *O. fruticosa*, having phyllodia or foliaceous petioles in place of leaves, like the Australian Acacias.—Of *Polygonaceæ*, an oblong-leaved *Coccoloba*, a shrub with inconspicuous flowers, frequent along the sea-coast.—Of *Nyctaginaceæ*, the *Pisonias* of several species, rather frequent, all of them shrubs with smooth tender foliage.—Species of *Cissus* occasionally met with, vines, some of them woody, others in great part herbaceous, and one or more species conspicuous from their sanguineous branching peduncles; the *C. quinquefolia*, often having the form of a rigid upright shrub, four to five feet high.—The *Tontelea scandens*, seeming really a parasitic woody vine, attaching itself at intervals to shrubs, widely rambling over them, and in an instance I examined, entirely disconnected from the ground; in this respect, presenting unexpected analogy with Cuscuta.—A species of *Norantea*, a large shrub, growing in swampy ground, the only representative of the *Marcgraviaceæ* met with.—The singular *Aristolochia labiosa*, an herbaceous mantling vine, was growing in the same swampy locality; in company with the showy-flowered *Cattleya*, an epidendric Orchideous plant.—*Lobelias*, somewhat rare, and all of them rank-growing and herbaceous; one species being not less than ten feet high, with the stem an inch in diameter.—While of bulbous-rooted plants, the only representatives were *Amaryllidaceæ;* the *Crinums*, already mentioned as abound-

ing in marshes; and two species of *Amaryllis* that seemed really epidendric, growing only on the trunks of trees.

The specimens we collected in Brazil were prepared by Mr. Brackenridge, and were not reviewed by myself; but immediately after leaving in the Vincennes, I made from memory a LIST OF THE PLANTS as seen growing, which List when first drawn up was examined together by Mr. Brackenridge and myself. As given below, the List, like most of those inserted in this volume, is compiled from two sets of notes; my original rough notes, and the revision of them entered on my Journal. Some incidental notices in my memorandum books have supplied further material; but all additions made subsequently, during the continuance and after the close of our voyage, are distinguished by being included in parentheses or rounded brackets, ( ).

For the *numbering of the species*, a geographical order has been adopted: commencing with Easter Island and the coral islands in the Pacific, and proceeding Westward through the East Indies and Tropical Asia and Africa to the Cape Verd Islands in the Atlantic; thence in the Southern Hemisphere from Chatham Island and New Zealand, Westward to Australia and Austral Africa; thence in the Northern Hemisphere, from the Azores and Madeira, Eastward through Europe, Asia, and Northwest America to our Atlantic States. By this arrangement, the Eastern Continent with all its appendages is kept separate from the American; and the numbers making the circuit of the globe, the experience of our whole voyage is in general applicable at every step in our description of the countries visited. In the following List, therefore, of the plants we observed in Brazil, No. 1 marks genera that did not make their appearance in the above-described circuit; Tropical America being now for the first time reached:

Davilla rugosa, Poir.; (No. 1). A woody vine, bearing some general resemblance to Celastrus scandens; not seen in flower; the berries unilocular. Rather frequent.*

Anona palustris, (No. 2). A small tree, intermingled with the mangroves; and with them and other submaritime trees, forming a regular forest, about twenty feet high, throughout the brackish swamps along the Estrella estuary.

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* Throughout this volume, the plants not indigenous, are enumerated by themselves in notes at the base of the pages. It should be observed, however, that during our visit to Rio Janeiro, I paid very little attention to the introduced plants, except to avoid them. The notices here given are therefore to be regarded as merely incidental.

Rollinia (No. 1).

Xylopia? (No. 1). A few other *Anonaceæ* were met with; like the preceding, all of them either shrubs or small trees.

Cissampelos? (No. 1). A vine.

——— (No. 2); a second species. A vine.

——— (No. 3); a third species. A vine.

——— (No. 4); perhaps a fourth species. Also a vine.

Nectris (No. 1). Aquatic; growing in pools near Magé, a few miles beyond the landing-place at Piedade.

Nymphæa? (No. 5). Nymphæa-like leaves observed on the surface of the water in the Estrella estuary, and large bluish flowers; but we did not approach near enough to procure specimens.

Capparis (No. 25). A shrub. Submaritime; and rather frequent along the sea-shore.

——— (No. 26); "a second species." Found by Mr. Brackenridge "on Mount Corcovado."

Cratæva (No. 1). A handsome shrub. Met with in two localities, both of them a short distance only from the sea-coast.

Cleome (No. 8). The flowers purple. One of the most abundant plants in open situations; growing in clearings, and along the banks of streams, especially in low ground subject to inundation.

Calyptrion (No. 1). A woody vine. Found by Mr. Brackenridge.

Glossarrhen? (No. 1). Herbaceous, upright, one to two feet high. Frequent at Tijuca and on the Organ Mountains, growing in the forest.

Sauvagesia (No. 1). A foot high. In a remarkable Sphagnous bog, at the Eastern base of the Organ Mountains, on the Estrella road.

Securidaca (No. 1). A woody vine, with handsome foliage.

——— (No. 2). A shrub.

Polygala (No. 16). A small herbaceous species, resembling P. verticillata.

——— (No. 17). Arborescent, becoming a small tree, thirty feet high, with the trunk nine inches in diameter; the flowers rather large, purple and showy. Beyond the Organ Mountains, rather frequent along the road to the Mines.

——— corisioides, St. Hil.; (No. 18). The leaves Crassula-like, succulent and linear. On the sea-beach, in front of a lagoon called the "Lagoa de Freitas," rare.

——— (No. 19); a fourth species.

Nov. gen.? laureola, (No. 1); Polygala of St. Hil. A shrub, two feet high, with large leaves. Growing in the deep forest.

Anona (No. 3). A tree of medium size, with large flowers and fruit. A single stock, planted at the intersection of the Botanic garden road and the Lagoa de Freitas.

Argemone Mexicana? (No. 1; bis Hawaiian Islands, Hindostan, and Zanzibar). Growing as a weed; and evidently introduced.

Cruciferæ. Several well-known European species naturalized; and growing as weeds around the city of Rio Janeiro.

Bixa Orellana, (No. 1; bis Hawaiian Islands, East Indies, Hindostan, and Zanzibar); the arnotto. A single stock, planted in a hedge-row, by the road-side.

Hibiscus esculentus, (bis Mocha and Egypt); the ochra. Cultivated.

Trigonia (No. 1). A woody vine.

———? (No. 2). A tree. On the Organ Mountains.—In general, *Polygalaceæ* were not very prominent amid the vegetable growth.

Mollugo. On the sea-beach. (Compare Australia, Interior Oregon, and North California.)

Paritium tiliaceum? (compare No. 1 Metia and the Hawaiian Islands to Sooloo in the East Indies). The flowers yellow. Submaritime; growing in salt marshes, and in the drier portions of the mangrove swamps.

Pavonia (No. 3).

Carolinea? (No. 1). The leaves only, of a tree supposed by us to belong to this genus.

Helicteres (No. 1).

Chorisia speciosa, St. Hil.; (No. 1). The trunk thickly clothed with large prickles. Frequent in the environs of Rio Janeiro; but not seen in the "matto virgem" or primeval forest, nor anywhere on the Organ Mountains.—*Bombaceæ*, being usually large trees, are perhaps not rare in Southern Brazil: young stocks were occasionally observed that seemed to belong to this Tribe; but we hardly met with any fallen flowers or fruit.

Waltheria elliptica, (compare No. 1 Hawaiian and Feejee Islands, and Zanzibar). Frequent, intermingled with the Sidas along road-sides and in open spaces: possibly introduced.

Luhea (No. 1). A forest-tree. On Mount Corcovado.

Heisteria (No. 1). At Praya Grande, on the opposite side of the bay; rather frequent.

Ximenia Americana? (No. 2). A small tree. Submaritime; growing along the bay-shore, near the landing-place at Piedade.

Hypericum (No. 16). Herbaceous and small; agreeing in habit with our Northern species. Growing by the road-side, beyond the Organ Mountains.

——— (No. 17); a second small herbaceous species, of similar habit.

Vismia (No. 1). A small tree. Frequent.

Clusia alba? (No. 1). A small tree, twelve to twenty feet high, with very stout leaves; the flowers white. Submaritime; growing abundantly along the sea-coast.

——— (No. 2). On the Organ Mountains, and elsewhere.

——— (No. 3). A small tree; the leaves small, and the flowers dull reddish-purple. In the Piedade Gap of the Organ Mountains, at the residence of Mr. March, "3100 feet above the sea."

Norantea (No. 1). A large shrub, twelve feet high. In drowned land along the Piedade road; and also growing near the sea-shore, in front of the Lagoa de Peteninga.

Erythroxylon (No. 6).

Stellaria media, (bis United States, &c.) Growing in the horse-path leading to the Piedade Gap in the Organ Mountains; evidently introduced.

Drymaria cordata, (No. 1; bis Luzon). Rather frequent; but seemed discordant, having much of the aspect of an introduced plant.

Sida rhombifolia? (No. 20). Abundant in waste ground, along road-sides, and in all open spaces; (possibly indigenous).

——— (No. 21). The petals contorted. Growing intermingled with the preceding species, and also abundant; (possibly indigenous).

——— (No. 22); apparently a third species. Growing intermingled with the two preceding; and (possibly indigenous).

Calypso? St. Hil., (No. 1); but the flowers not seen. On the Organ Mountains.
Tontelea scandens? (No. 1). A parasitic woody vine, widely rambling over shrubs; and, unlike most woody vines, avoiding trunks of trees.
Banisteria (No. 2). A woody vine; the flowers yellow, as in all the Malpighiaceæ I met with in Brazil.
——— (No. 3); a second species. A woody vine.
——— (No. 4); a third species. A woody vine.
——— (No. 5); a fourth species. A woody vine.
——— (No. 6); a fifth species. A woody vine.
(Byrsonima? No. 1). Banisteria-like, but an upright shrub, twelve feet high. Submaritime; frequent on the sands back of the sea-beach.
Stigmaphyllon (No. 1). An herbaceous vine, having much of the aspect of Vitis. Growing over rocks in the neighborhood of the sea-coast.
Heteropteris (No. 1). The under surface of the leaves covered with golden pubescence.
——— (No. 2); a second species.
——— (No. 3); a third species.
Tetrapteris (No. 1). Frequent.
Paullinia (No. 2). A woody vine, more or less climbing.
——— (No. 3); a second species. A woody vine.
——— (No. 4); a third species. A woody vine.
——— (No. 5); a fourth species. A woody vine.
——— (No. 6); a fifth species. A woody vine.
——— (No. 7). Like all the preceding species, a woody vine, ornamental from the foliage, but the flowers inconspicuous.
Sapindus (No. 9); only one species met with. A frequent shrub.
Cupania (No. 1).
——— (No. 2); a second species.
Dodonæa (compare No. 1 Metia and the Hawaiian Islands to Mindanao, Oman, the Mountains of Yemen, and Zanzibar). On the sands of the sea-coast, once only met with.
Trichilia elegans, St. Hil.? (No. 1). An ornamental shrub. On the Organ Mountains.
——— (No. 2); a second species.
——— (No. 3); a third species.
Guarea (No. 1). A large tree. Rather frequent.
——— (No. 2). At Tijuca, in the environs of Rio Janeiro.
——— (No. 3); a third species.—The fallen flowers of other species of *Meliaceæ* were met with in the forest, beneath lofty trees, but their source could not be ascertained.
Cedrela Brasiliensis, St. Hil.? (No. 1).

Apeiba (No. 1). Seen only in gardens.
Urena lobata, (bis Polynesian Groups, and the East Indies). Abundantly naturalized in the environs of Rio Janeiro.
Triumfetta (No. 3; compare Luzon, Bombay, and Zanzibar). Rather frequent around the city of Rio Janeiro.
Muntingia (No. 1). "Brought from the Northward," and seen under cultivation at Eugenho Velho, the residence of Mr. J. Gardner. The timber spoken of "as remarkable for its lightness."

Gen. incert. (No. 1). A trifoliolate woody vine; the fruit elongate, four valved. In shady places, at the elevation of 3100 feet in the Piedade Gap of the Organ Mountains.

Cissus quinquefolia, Sims; (No. 29). Often taking the form of a rigid, upright shrub, four to five feet high.

——— (No. 30). A woody vine; rendered conspicuous when in flower or fruit, by its sanguineous branching peduncles.

——— (No. 31); a third species. A woody vine.

——— (No. 32); a fourth species. A woody vine.

——— (No. 33); a fifth species. A woody vine.

——— (No. 34). Other species of Cissus were met with; but were not critically examined; and in general, the Tribe proved less abundant than we anticipated.

Oxalis urbica, (No. 16); normal. A small herbaceous species, allied to O. violacea; the flowers purple. Frequent along road-sides; (perhaps not indigenous.)

——— (No. 17); habit of Desmodium. A shrub, five feet high, with the stem half an inch in diameter. In woods, near the fortress at the entrance to the bay.

——— (No. 18); a second Desmodium-like species.

——— confertissima, St. Hil.? (No. 19). Frequent beyond the Organ Mountains.

——— fruticosa (No. 20). A shrub, with phyllodia, or foliaceous petioles, in place of leaves. Indigenous in the "environs of Rio Janeiro," found by Mr. Brackenridge.

Guaiacum? (No. 1).

Almeidea (No. 1).

Zanthoxylum (No. 1). A large tree.

——— (No. 2); a second species.

Gomphia (No. 1). A shrub, five to eight feet high; agreeing with Ochnaceæ in the fruit. On the upper portion of the Organ Mountains, growing in the deep shade of the "matto virgem" or primeval forest.

Casearia? (No. 1).

Rhus (No. 19); resembling our R. venenata. In a marsh at Tijuca.

——— (No. 20); a second species.

Sophora littoralis (No. 2). Maritime, growing on the sea-beach.

Crotalaria (No. 23). Leaves simple; the flowers yellow.

——— (No. 24). Herbaceous; leaves trifoliolate; the flowers yellow.

——— (No. 25). Herbaceous; leaves trifoliolate; the flowers yellow.

——— (No. 26). Herbaceous; leaves trifoliolate; the flowers yellow.

Galactia (No. 2). An herbaceous vine. Rare.

Citrus aurantium, (bis Polynesian Groups, Zanzibar, Egypt, Madeira, &c.). Oranges, for sale in the market; and the bitter variety seen under cultivation on the mountains around the city, at the elevation of 2500 feet.—Other Aurantiaceæ were met with, some of the species planted, and others naturalized, but none indigenous.

Cardiospermum, (compare C. helicacabum).

Urvillea rufescens, St. Hil.; (No. 1). Planted in hedges.

Vitis vinifera, (bis Hindostan, the mountains of Yemen, the island of Zanzibar, &c.); the grape. Cultivated.

Oxalis. A species having the habit of O. corniculata; herbaceous and humble; the flowers yellow. Growing by the road-side, beyond the Organ Mountains.

Indigofera (No. 24). A shrub, three to five feet high. Rather frequent to the end of our journey, beyond the Organ Mountains.

Clitoria (No. 1). Large blue flowers; and "in one instance white." Rather frequent.

——— (No. 2); a second species.

Zornia (No. 2).

Stylosanthes (No. 3).

Aeschynomene (No. 2). Herbaceous; two to four feet high. In wet ground, frequent.

——— (No. 3); a second species. In wet ground.

Desmodium (No. 34). Herbaceous, and inconspicuous. Growing in the forest.

——— (No. 35); a second inconspicuous species. Growing in the forest.

——— (No. 36); a third inconspicuous species.

——— (No. 37); a fourth inconspicuous species.

Rhynchosia (No. 6). An inconspicuous herbaceous vine; the flowers yellow.

——— (No. 7); a second species. An inconspicuous herbaceous vine.

——— (No. 8); a third species. An inconspicuous herbaceous vine.

——— (No. 9); a fourth species. An inconspicuous herbaceous vine.

Phaseolus (No. 8). A prostrate herbaceous vine. On the sands of the sea-coast, near the Lagoa de Peteninga.

——— (No. 9); a second species.

Dolichos (No. 3).

Mucuna (No. 7). A lofty climbing vine; having each raceme of flowers pendulous, at the end of a string-like peduncle six feet or more in length.

——— (No. 8); a second species.

——— (No. 9); a third species.

Erythrina (No. 7). Only the young stocks seen; the leaves very large, the terminal leaflet measuring in one instance eighteen inches in the longest diameter.

——— (No. 8). A small tree, with stout coarse branches, and showy purple flowers. At Tijuca and elsewhere.

Pterocarpus? (No. 1). A small tree. Growing on the bay-shore at Praya Grande.

Geoffroya (No. 1). A large tree, with the habit of Juglans. Near the Lagoa de Peteninga; possibly planted.

Mimosa (No. 10). Prostrate and herbaceous; the flowers purple. Frequent on submaritime sands along the sea-shore.

——— (No. 11); a second species.

——— (No. 12); a third species.

(Entada) scandens? (compare No. 1, Samoa, Tongataboo, and the Feejee Islands).

Guilandina bonduc, (compare No. 1, Samoa to the Feejee Islands and Mindanao). Rare; met with in two or three localities on the sea-shore.

Tribulus?. Growing in waste ground; probably introduced.

Anacardium Occidentale, (No. 1; bis Singapore, Hindostan, and Zanzibar). Planted as an object of cultivation.

Mangifera indica, (bis Luzon, Hindostan, and Zanzibar); the mango. The fruit for sale in the market.

Arachis hypogea, (No. 1, bis Hindostan and Zanzibar). Seen only under cultivation.

Inga (No. 8). A large tree; the flowers white. Growing on the Organ Mountains.
——— (No. 9); a second species.
——— (No. 10); a third species.
Cæsalpinia (No. 3). A lofty tree, with the trunk somewhat slender. The yellow-flowered summits conspicuous in the distance here and there throughout the forest, to the end of our excursion beyond the Organ Mountains.
Cassia (No. 20). A small tree, with yellow flowers, and rather showy. Frequent on Mount Corcovado.
——— (No. 21); another species, becoming a small tree.
——— (No. 22). A small shrub, a foot high. On the submaritime sands near the Lagoa de Peteninga; rare.
——— (No. 23); a fourth species.
——— (No. 24); a fifth species.
Bauhinia (No. 5). A small tree. Frequent along the road-side, after crossing the Estrella Gap of the Organ Mountains.
——— (No. 6). A woody vine; the leaves elongate, acute.
——— (No. 7); a third species. A woody vine.
——— (No. 8); a fourth species. A woody vine.—In general, the species of Bauhinia proved far less abundant than we anticipated.
Rubus (No. 28). Frequent from the coast to and beyond the Organ Mountains; but seeming exceptional, out of place amid the Tropical growth.
Cuphea (No. 2). A small herbaceous plant, like all the following species. Frequent.
——— (No. 3). Frequent. (Perhaps the species observed growing in the above-mentioned Sphagnous bog, at the Eastern base of the Organ Mountains.)
——— (No. 4). Met with beyond the Organ Mountains.
——— flava (No. 5). The flowers yellow. On the submaritime sands, near the Lagoa de Peteninga; rare.
Rhizophora mangle, (compare No. 1 Samoa to Luzon and Sooloo); the mangrove. In salt-marshes, and forming miry swamps along the bay-shore within reach of the tide.
Laguncularia racemosa, (No. 1.) A shrub or small tree. Abundantly intermingled in the mangrove swamps along the shores of the bay.
Terminalia? (No. 7).
Gen. Terminalioid (No. 1). A shrub; four spines below each tuft of leaves.
Vochysia (No. 1). A small tree, with showy deep-yellow flowers in terminal upright racemes. Finely in flower on the 31st of December; when, being conspicuous at a long distance, the tree was found to be frequent on Mount Corcovado.

Phaseolus vulgaris? (No. 10). Black beans, all of one variety, a principal article of food everywhere in the Interior.
Acacia (No. 40). Called the "umbrella tree;" highly ornamental from its very large compound leaves radiating at the end of the branches, so that young stocks that are simple-stemmed have much of the aspect of arborescent ferns. Seen only in gardens.
——— (No. 41). Much cultivated for hedges.
Tamarindus Indica, (bis No. 1 Hindostan and the Cape Verd Islands). Cultivated.
Poinciana pulcherrima, (bis Taheiti, Hawaiian Islands, &c.). Seen only in gardens.

Gen. Melastomac. (No. 1). A tree of medium size, forty to fifty feet high.

——— (No. 2); perhaps not a congener of the preceding species. A tree of medium size, the trunk sometimes two feet in diameter.

Gen. Melastomac. (No. 1). Herbaceous. Growing in the above-mentioned Sphagnous bog, at the Eastern base of the Organ Mountains.

——— (No. 2). Herbaceous. Growing in company with the preceding species, in the same Sphagnous bog.—One or two other herbaceous Melastomaceæ were met with, in different localities.

Melastomac. incert.—In all, more than thirty species of *Melastomaceæ* were met with, mostly shrubs, belonging to several distinct genera.

Psidium (No. 1). A shrub. Growing at the base of the Organ Mountains.

——— (No. 2); a second species.

——— (No. 3); a third species.

Myrtus (No. 16). A shrub, twelve feet high; the leaves small. Submaritime; growing on the sands along the sea-shore.

——— (No. 17); apparently congeneric with the preceding species.

———? (No. 18). A shrub; the leaves small and obliquely placed, all in one and the same plane. On the Organ Mountains; rare.

——— (No. 19); a fourth species.

——— (No. 20); a fifth species.

——— (No. 21); a sixth species.

——— (No. 22); a seventh species.

Myrcia (No. 1).

——— (No. 2); a second species.

——— (No. 3); a third species.

——— (No. 4); a fourth species.

——— (No. 5); a fifth species.

——— (No. 6); a sixth species.

Calyptranthes (No. 1).

——— (No. 2); apparently congeneric with the preceding species.

——— (No. 3); apparently congeneric with the two preceding species.

———? (No. 4). A low shrub; the leaves roundish, and with all the herbaceous parts excessively brittle; the flowers, also, falling at the slightest touch. Submaritime: Growing on the sands of the sea-shore, in extensive scattered beds, about a foot high.

——— (No. 5); a fifth species.

Fragaria. Strawberries cultivated at March's residence, at the elevation of "3100 feet" among the Organ Mountains.

Rosa. One or more species, planted in hedges.

Pyrus communis, (bis Persian Gulf, New Zealand, Australia, Austral Africa, and St. Helena); the pear. Cultivated.

Malus sylvestris, (bis Yemen, New Zealand, Australia, and Austral Africa); the apple. Cultivated; and on the mountain-ridges at Tijuca, trees observed bearing at the same time both fruit and flowers.

Cydonia vulgaris, (bis Yemen, Australia, and the United States); the quince. Cultivated at March's residence.

Eugenia (No. 3).
——— (No. 4); a second species.
——— (No. 5); a third species.
——— uniflora, (No. 6); Plinia of Linn. An arborescent shrub, twelve to twenty feet high. Submaritime; abounding on the sands along the sea-shore. The conserved fruit well known in Brazil under the name of "padangas."
——— (No. 7); a fifth species.
——— (No. 8); a sixth species.
——— (No. 9); a seventh species.
——— (No. 10); Greggia of Gærtn. A shrub. Growing in the vicinity of the Organ Mountains.
——— (No. 11); a ninth species.
——— (No. 12). A tree; the fruit sessile on the trunk and branches, and of the size of a small apple.
——— (No. 13); an eleventh species.
——— (No. 14); a twelfth species.
——— (No. 15); a thirteenth species.
——— (No. 16); a fourteenth species.
——— (No. 17); a fifteenth species.
——— (No. 18); a sixteenth species.
——— (No. 19); a seventeenth species.
——— (No. 20); an eighteenth species.
——— (No. 21); a nineteenth species.
Gustavia? (No. 1). A tree of the largest size, known by the fallen flowers. Met with in the primeval forest, at the elevation of 4000 feet on the Organ Mountains.
Lecythis (No. 1). A tree of more than medium size, with showy bright-yellow flowers. Occasionally met with.
Jussiæa (No. 6). Herbaceous, two to five feet high. Frequent with other species, in marshes and wet ground.
——— (No. 7). Growing in the above-mentioned Sphagnous bog, at the Eastern base of the Organ Mountains.
——— (No. 8); a third species. Growing in wet ground.
——— (No. 9); a fourth species. In wet ground.
——— (No. 10). Remarkable for its white flowers. In wet ground, on the Piedade road.
Cucurbitaceæ. Occasionally met with, but neither abundant, nor in much variety. The species observed belonged to three or four genera that were new to me; none of them bearing conspicuous flowers, nor large fruit.

Amygdalus Persica, (bis Hawaiian Islands, Zanzibar, New Zealand, and Australia); the peach. Cultivated by Mr. March, at the elevation of "3100 feet" among the Organ Mountains; but he had experienced "much difficulty in getting the trees accustomed to the climate."
Punica granatum, (bis Hindostan, Zanzibar, and No. 1 Oman and the mountains of Yemen). Planted in gardens.
Jambosa vulgaris, (bis Zanzibar); the white-fruited rose-apple. Cultivated; the fruit insipid, with a weak aromatic flavor.

Passiflora (No. 7). An herbaceous vine.
——— (No. 8); a second species. An herbaceous vine.
——— (No. 9); a third species. An herbaceous vine.
——— (No. 10); a fourth species. An herbaceous vine.
——— (No. 11); a fifth species. An herbaceous vine.
——— (No. 12); a sixth species. And perhaps others not critically examined.
Mentzelia (No. 2). Occasionally met with.
Turnera (No. 1). Frequent.
——— (No. 2); a second species.
Portulaca (No. 9). A species having small purple flowers. In salt marshes.
——— (No. 10); "a second species, pilose. Growing on the hills," Brackenridge.
Kalanchoe Brasiliensis, St. Hil.; (No. 1). Submaritime; frequent on rocks along the bay-shore at Praya Grande; yet seeming discordant, hardly having the aspect of an indigenous plant.
Opuntia (No. 4). A large species. Growing on rocks, and rocky bluffs facing the sea.
——— (No. 5); "a second species," Brackenridge.
"Melocactus" (No. 1). Submaritime. Buried to the crown of flowers, in the sands near the Lagoa de Peteninga; rare, once only met with.
Cereus (No. 1). Columnar. Frequent along the sea-shore.
——— (No. 2). Columnar. Growing on rocks along the sea-shore, at the Lagoa de Peteninga and elsewhere.
——— (No. 3). Scandent; the stems quadrangular. Frequent along the sea-coast. In some instances fairly epidendric, having made a lodgement in tree-tops.
——— (No. 4); "a fourth species. Scandent; the stem triangular," Brackenridge.
——— (No. 5); a fifth species.
Epiphyllum (No. 1). Met with in the neighborhood of the Organ Mountains; epidendric on the roots and trunks of trees in the forest.
——— (No. 2); "a second species" observed by Mr. Brackenridge.
Rhipsalis (No. 1). Epidendric, pendent from the trunks of trees; frequent.
——— (No. 2); a second species.
——— (No. 3). At the summit of one of the peaks of the Organ Mountains.
——— (No. 4). On rocks, near the Lagoa de Freitas.
——— (No. 5); a fifth species.
Belangera speciosa, St. Hil.; (No. 1). A tree. Rather frequent at Tijuca, and elsewhere in the environs of Rio Janeiro; observed also, among the Organ Mountains.

Psidium guayava, (No. 4; bis Taheiti, Hawaiian Islands, Luzon, Hindostan, and Zanzibar.) Cultivated; and besides, abundantly naturalized in somewhat open situations, as far as we journeyed beyond the Organ Mountains; perhaps not indigenous in this part of Tropical America.
——— (No. 5). A small tree; (the fruit unripe, perhaps not esculent). Planted in a garden at Tijuca. I had previously seen specimens collected by the late Dr. Wm. Baldwin, and attributed, perhaps through some displacement, to Florida.
Carica papaya, (No. 1; bis Metia and the Hawaiian Islands to the East Indies, Hindostan, and Zanzibar.) Seen only under cultivation; it being "considered necessary to plant in proximity" the kind with paniculate flowers.

Hydrocotyle (No. 16).

Araliaceæ. Some large trees met with; showing that the Tribe may enter in considerable proportion into the composition of the primeval forest.

Loranthus (No. 15); a species with red and showy flowers. On trees at the Eastern base of the Organ Mountains; and occasionally met with elsewhere.

Manettia (No. 1). A climbing herbaceous vine.

Exostemma (No. 1).

Coccocypselum (No. 1). A low herb; the berries blue. Beyond the Organ Mountains.

——— (No. 2); a second species.

——— (No. 3); a third species.

Gardenia? (No. 4); Oxyanthus-like, but the corolla-segments not acute. A shrub, with fragrant white flowers; the tube of the corolla straight and very long, and the segments somewhat contorted. Met with in two or three localities.

Genipa? (No. 1). A tree of medium size; forty feet high; from the foliage and large size of the fruit, at first mistaken for one of the Guttiferæ. Among the Organ Mountains, once only met with.

Hedyotis (No. 17). A small herbaceous plant. Intermingled with grasses in wet ground.

——— (No. 18). A second small herbaceous plant.

——— (No. 19). A third small herbaceous plant. One of these three species growing in the above-mentioned Sphagnous bog, at the Eastern base of the Organ Mountains.

Augustea? (No. 1).

———? (No. 2). Ornamental; the calyx and corolla long and tubular, and both of them blue. In woods near the fortress at the entrance to the bay; not met with elsewhere.

Sabicea (No. 1). A climbing shrub.

Morinda? (No. 9).

Guettarda (No. 3). The leaves reticulate.

——— (No. 4); a second species.

——— (No. 5); a third species.

Cephaelis (No. 1). A shrub, three to five feet high. Rather frequent in the deep shade of the forest.

Palicourea (No. 1). Smooth; the inflorescence cymose, with the branching peduncles sanguineous. Frequent.

——— (No. 2); a second species.

Talinum patens, (No. 6; bis Taheiti). Having small, but rather pretty flowers. Naturalized in the outskirts of the city.

Pereskia (No. 1). Planted in hedges; and becoming a regular normal tree; one, by the road-side between Praya Grande and San Joao, was observed to have much of the aspect of the garden plum, being full thirty feet high, with the trunk ten inches in diameter.

Umbellif. incert. A species met with in one locality on the rocks of the sea-coast, and apparently native. (According to Gray, in his Volume on the Plants of the Expedition, shown by the specimen to be only "Apium graveolens escaped from cultivation.")

Daucus carota, (bis Australia, Austral Africa, Interior Oregon, and our Atlantic States). Carrots for sale in the market; and cultivated also at March's residence.

Psychotria (No. 1).
——— (No. 2); a second species.
——— (No. 3); a third species.
——— (No. 4); a fourth species.
——— (No. 5); a fifth species.
——— (No. 6); a sixth species.
——— (No. 7); a seventh species.
——— (No. 8); an eighth species.
Faramea (No. 1).
Chiococca (No. 3). A pretty shrub. Occasionally met with.
Borreria (No. 1).
——— (No. 2). Growing on the sands of the sea-shore.
——— (No. 3); a third species.
——— (No. 4); a fourth species.
——— (No. 5); a fifth species.
Spermacoce (No. 3).
Diodia (No. 2). Much resembling our D. Virginica. Growing in wet ground, and along the banks of streams.
——— (No. 2); a second species.
Richardsonia (No. 1). Low, with the leaves broad. Frequent.
——— (No. 2); a second species.
——— (No. 3); a third species.
Gen. Coffeac. (No. 1). The calyx spreading at the summit, persistent, purple; the corolla yellow; the ripe berry blue. Frequent in the forest.
——— (No. 2).
——— (No. 3).
Gen. incert. (No. 1); from the interpetiolar stipule, apparently belonging to the Coffeaceæ, but the leaves laciniate or incised; the flowers not seen. A young stock, with leaves eighteen inches in length, met with on the route to the Lagoa de Peteninga.
Gen. (Gardenioid ?, No. 1. Habit of some Samoan Coffeaceæ); a tall and straight shrub, twenty feet high, having a few upright branches; the leaves nearly three feet long; the flowers inconspicuous.
Coffeac. incert. (No. 1).
——— (No. 2); a second undetermined Coffeac.
——— (No. 3); a third undetermined Coffeac.
——— (No. 4); a fourth undetermined Coffeac.
Acicarpha spathulata, (No. 1). Frequent on the sands of the sea-shore.
Leria? (No. 1). Frequent.

Coffea Arabica, (bis Hawaiian Islands, Taheiti, Luzon, and No. 1 Equatorial Africa); coffee. The principal object of cultivation in the hilly region around Rio Janeiro.
Stiftia (No. 4). In the Botanic garden.
Elephantopus (No. 1; bis? environs of Manilla). Frequent in dry, open situations around Rio Janeiro; (perhaps not indigenous in this part of Tropical America).
Elephantosis (No. 1; bis? environs of Manilla). Growing around Rio Janeiro; (perhaps only naturalized, and not indigenous in this part of Tropical America).

Mutisia (No. 1). A weak-stemmed herbaceous plant, having something of the habit of Lathyrus. Growing at Tijuca, among mountains.

Stiftia (No. 1).

——— (? No. 2).

——— (? No. 3).

Heterocoma? (No. 1). A climbing woody vine, with axillary large flowers. Met with in two or three localities.

Vernonia (No. 9). Cymose, with the flowers sessile. In hedges and similar situations; rather frequent.

——— (No. 10); a second species.

——— (No. 11); a third species.

——— (No. 12); a fourth species.

Albertinia (No. 1). A small tree; the calyx-scales downy.

Eupatorium (No. 10). Herbaceous, and normal, much resembling some of our North American species. Growing in the above-mentioned Sphagnous bog, at the Eastern base of the Organ Mountains.

——— (No. 11). Abnormal, having the habit of some West Indian species.

——— (No. 12); a second abnormal species.

——— (No. 13); a third abnormal species.

——— (No. 14); a fourth abnormal species.

——— (No. 15); a fifth abnormal species.

——— (No. 16); a sixth abnormal species.

Mikania (No. 5). An herbaceous vine. Occasionally met with.

——— (No. 6); a second species. An herbaceous vine.

——— (No. 7); a third species. An herbaceous vine.

Baccharis (No. 5). A shrub, four to six feet high. Rather frequent.

——— (No. 6); a second species. A shrub. Also frequent.

——— (No. 7); a third species.

——— (No. 8). Only a foot high, the stem trialate. Beyond the crest of the Organ Mountains, near the residence of Padre Luiz.

———? (No. 9); abnormal. A shrub, six to twelve feet high; a transverse section of the stem showing a stellate pith-cavity. Everywhere frequent.

Pluchea (No. 6).

Pterocaulon (No. 1).

Spilanthes (No. 1).

——— (No. 2); a second species.

Porophyllum (No. 1). Growing at the base of the Organ Mountains.

——— (No. 2); a second species.

——— (No. 3); a third species.

Ageratum (conyzoides, No. 1; bis Polynesian Groups, Hindostan, Zanzibar, St. Helena, and Madeira). Growing in the environs of Rio Janeiro, (but probably not indigenous in this part of Tropical America).

Cænotus (Bonariensis?, No. 7); resembling C. Canadensis, but the lower leaves pinnatifid. A frequent weed.

Eclipta (compare Peru, Feejee Islands, Mindanao, Hindostan, and Zanzibar). Frequent.

Ambrosia (No. 6). Growing along the margin of the brackish lagoon, called the "Lagoa de Peteninga."

Lobelia (No. 48). Herbaceous, ten feet high; the stem an inch in diameter, upright and simple, terminating in a raceme, three or four feet long, crowded with flowers; leaves lanceolate, (the lower ones) a foot in length. In two or three localities, beyond the Organ Mountains.

——— (No. 49). Having solitary large flowers.

——— (No. 50); "a third species," Brackenridge.

——— (No. 51); "a fourth species," Brackenridge.—*Lobeliaceæ* proved to be quite rare.

Gaylussacia (No. 1). A species said to occur "on the coast to the Eastward," but not seen by ourselves.

Utricularia (No. 9). The flowers yellow. Growing in pools, along the Piedade road.

——— (No. 10). The flowers purple. In pools along the Piedade road.

Samolus (compare No. 1 United States).

Ardisia? (No. 2). A shrub, ten feet high: observed along the Piedade road.—A few other shrubs were met with, that appeared to belong to *Myrsineaceæ*.

Gen. Sapotac.? (No. 1). A tree, dwarfed and gnarled by mountain exposure so as not to exceed thirty feet in height. Growing on the summit of the Estrella Peak of the Organ Mountains, hardly less than 4500 feet above the sea.

——— (No. 2). The fallen seeds met with not unfrequently beneath the lofty trees of the primeval forest.

——— (No. 3). A low shrub. On submaritime sands, near the Lagoa de Peteninga.

Styrax (No. 1). A shrub, about fifteen feet high. Growing beyond the Organ Mountains, and once only met with.

Jasminum (No. 14). The flowers white. In wild situations; here and there met with, and to all appearance indigenous.

Gen. Apocyn. (No. 1). Nerium-like; an ornamental shrub, twelve feet high; the flowers white. Growing beyond the Organ Mountains, at the limit of our excursion.

Echites (No. 1).

——— (No. 2); a second species.

——— (No. 3); a third species.

——— (No. 4). Having large yellow Convolvulus-like flowers.

——— (No. 5). The flowers dark-red. Growing on rocks.

——— (No. 6). The flowers white. These six species, evidently not congeneric, and some of them quite showy, occurred singly at rare intervals, a stock being here and there intermingled in the vegetable growth.

Gen. incert. (No. 1). Fallen Ophioxylon-like fruit met with on the Organ Mountains.

Bidens bipinnata? (compare sp. of the environs of Philadelphia). Frequent in cultivated ground.

Calliopis tinctoria, (bis, brought by Nuttall from Arkansas). In the midst of the profusion and magnificence of the Brazilian wilderness, the want of pleasing flowers was indicated by a stock of Calliopsis, nurtured with care at the window of a residence among the Organ Mountains.

Acanthospermum xanthioides?, (No. 1). A frequent weed in coffee plantations.

Specularia amplexicaulis?, (compare Oregon and our Atlantic States.)

(Sarcostemma? No. 2); compare Cynanchum scoparium of Florida. Climbing, herbaceous, branching, and nearly leafless. Met with in the Estrella Gap of the Organ Mountains; (having the aspect of an introduced plant, and probably only naturalized).

Gen. near Cynanchum, (No. 1). A small herbaceous vine.

Cynanchum-like (No. 1).

——— (No. 2); a second species.

——— (No. 3); a third species.

Spigelia anthelmia, (No. 1). A low herb. Growing in wet ground, in the Estrella Gap of the Organ Mountains.

Lisianthus (No. 1). Herbaceous, five to eight feet high. In the Estrella Gap of the Organ Mountains; growing in the deep forest, rare.

Bignonia (No. 3). A woody vine, with large white flowers.

——— (No. 4). A woody vine; the flowers purple, and rather small.

——— (No. 5). A woody vine, with large yellow flowers.

——— (No. 6). A woody vine, with yellow flowers; like most of the following species.

——— (No. 7); a fifth species.

——— (No. 8); a sixth species.

——— (No. 9); a seventh species.

——— (No. 10); an eighth species.

——— (No. 11); a ninth species.

——— (No. 12); a tenth species.

——— (No. 13); an eleventh species.—The Brazilian *Bignoniaceæ* present a fine subject for an illustrated monograph, having large-sized colored plates; for no just idea of this beautiful Tribe can be obtained from dried specimens.

Gloxinia (No. 1). A red-flowered variety found near (on one of the cliffs of) the sea-coast, by Mr. Brackenridge.

Gesneria bulbosa (No. 1). Growing on the summit of Mount Corcovado.

——— (No. 2); a second species.

——— (No. 3); a third species.

——— (No. 4); a fourth species.

(Ipomœa) pes-capræ, (bis No. 2 Metia to the Feejee Islands, Mindanao, and Zanzibar). Maritime, abundantly spreading over the sands of the sea-shore.

Convolvulus (? No. 10). Growing in inland situations.

——— (? No. 11). Growing in inland situations.

——— (? No. 12). Growing in inland situations.

——— (? No. 13). Almost stemless; bearing only a solitary flower. Maritime, growing on the sands of the sea-shore.

Anagallis (compare No. 1 Malta, and Egypt); blue-flowered. Naturalized in the outskirts of the city.

Olea sativa, (bis Mediterranean countries and Bombay). Cultivated at the residence of Mr. March, at the elevation of "3100 feet" among the Organ Mountains.

Carissa "spinarum," or a plant closely resembling it. Met with in a wild portion of the Organ Mountains, not far from the horse-path leading to March's residence; (probably only naturalized).

Vinca rosea. Naturalized; once only met with.

(Jacquemontia? No. 1). Convolv., having small blue flowers.
Evolvulus (No. 3).
——— (No. 4); a second species.
Dichondra (compare Chili, New Zealand, and Australia).—Except on the sea-shore, *Convolvulaceæ* were decidedly rare; so as to be altogether lost sight of amid the general vegetable growth.
Varronia (No. 1). A shrub, three to four feet high. Abounding in open situations, in the neighborhood of the city, and along road-sides; (and having much of the aspect of an introduced plant.)
Tournefortia (No. 4). A climbing shrub.
——— (No. 5); a second species.
——— (No. 6); a third species.
——— (No. 7); a fourth species.
——— (No. 8). A small tree, with the leaves hard and fragile.
——— (No. 9); a sixth species.
——— (No. 10); a seventh species.
Cestrum (No. 1). A many-stemmed shrub, eight to twelve feet high. Growing in the environs of Rio Janeiro, and observed also to be very abundant beyond the Organ Mountains.
——— (No. 2); a second species.
——— (No. 3); a third species.
"Solandra grandiflora," (No. 1). A many-stemmed shrub, ten feet high. On the banks of the Rio Piabanha, at the end of our excursion; clearly indigenous.
——— viridiflora, (No. 2). A shrub. At the Lagoa de Freitas, rare, once only met with.
Gen. near Solandra (No. 1); the flowers smaller, white and fragrant. A frequent ornamental shrub.
Gen. incert. (No. 1). An herb, with filiform peduncles, and the corolla slender. Met with in several localities.
Nov. gen.? (No. 1). An ornamental shrub, with the leaves coriaceous and entire, and the flowers white.
——— (No. 2; perhaps not a congener of No. 1).
——— (No. 3; perhaps not a congener of No. 1).
Capsicum (No. 1).
——— (No. 2); a second species.
——— (No. 3); a third species.

Asclepias Curassavica (No. 13; bis). Frequent, but apparently only naturalized.
Crescentia cujete, (No. 1); the calabash tree. Only seen planted.
Bignonia (No. 14). A tree, thirty feet high, with large yellow flowers; (perhaps only seen planted.)
Batatas edulis, (bis Metia and the Hawaiian Islands to New Zealand, the East Indies, and the United States). The roots for sale in the market.
Cuscuta. Growing on some low plants by the road-side; probably not indigenous.
Heliotropium Europæum. Naturalized.
Tiaridium (compare No. 1 Luzon). Naturalized; and rather frequent, growing often in wild situations.

Solanum (No. 30). A small tree; having the fruit yellow, and as large as a pullet's egg. Growing on the crest of one of the mountain-ridges at Tijuca, at the elevation of at least 1500 feet above the sea.

——— (No. 31). A shrub, with very coarse and stout "paleaceous" branches. Met with beyond the Organ Mountains.

——— (No. 32). Having large purple flowers.

——— (No. 33); a fourth species.

——— (No. 34); a fifth species.

——— (No. 35); a sixth species.

——— (No. 36); a seventh species.

——— (No. 37); an eighth species.

——— (No. 38). Rank-growing and herbaceous, like most of the following species.

——— (No. 39); a tenth species.

——— (No. 40); an eleventh species.

——— (No. 41); a twelfth species.

——— (No. 42); a thirteenth species.

——— (No. 43); a fourteenth species.

——— (No. 44); a fifteenth species.

——— (No. 45); a sixteenth species.

——— (No. 46); a seventeenth species.

——— (No. 47); an eighteenth species.

——— (No. 48); a nineteenth species.

——— (No. 49); a twentieth species.

——— (No. 50); a twenty-first species.

——— (No. 51); a twenty-second species.

——— (No. 52); a twenty-third species.

Franciscea (No. 1). A shrub; the flowers blue.

——— (No. 2); a second species. Also a shrub.

Herpestis. A low herb. Growing on the exsiccated margin of pools.

——— (No. 2).

——— (No. 3).

Gratiola? (No. 7); or compare Lindernia.

Buddleia? (No. 1).

——— (No. 2); a second species.

Rhinanthus? (No. 3). In the Sphagnous bog, above-mentioned, at the Eastern base of the Organ Mountains.

Ocymum (No. 13). On the Organ Mountains.

Peltodon radicans? (No. 1). On the Organ Mountains, frequent.

Nicotiana tabacum, (bis Polynesian Groups, East Indies, Australia, and the United States); tobacco. Naturalized; old plants growing around houses.

Datura. Naturalized around houses.

Brugmansia (No. 1). Naturalized around houses.

Physalis. Growing in waste ground.

Solanum tuberosum, (bis Singapore, Hindostan, Zanzibar, and the United States). Potatoes for sale in the market.

Hyptis (No. 1; bis? Luzon and Mindanao). The flowers capitate. Frequent along road-sides, and in other open situations.

——— spicata? (No. 2; bis Mindanao.) Frequent along road-sides, in the outskirts of the city; (perhaps not indigenous in this part of Tropical America).

Salvia splendens, (No. 5). Herbaceous, six feet high, with the stem quadrangular, although two-thirds of an inch in diameter. On the banks of a streamlet below the residence of Mr. Lecesne at Tijuca; perhaps not really indigenous there.

——— (No. 6); a second species, having scarlet flowers. Beyond the Organ Mountains.

——— (No. 7); a third species having scarlet flowers.

——— (No. 8); a fourth species having scarlet flowers.

Lantana (No. 2). The flowers orange-colored. A shrub, like the species generally.

——— (No. 3); a second species having orange-colored flowers. A shrub.

——— (No. 4); a third species having orange-colored flowers. A shrub.

——— (No. 5); a fourth species having orange-colored flowers. A shrub.

——— (No. 6). The flowers purple. A shrub.

——— (No. 7); a second purple-flowered species. A shrub.

——— (No. 8). The flowers white. A shrub.

——— (No. 9). The only herbaceous species met with. Growing near the sea-coast.

Avicennia (compare No. 1 Sooloo, Hindostan, and Zanzibar). Growing in salt marshes, intermingled abundantly in the mangrove-swamps.

Mendozia (No. 1). An herbaceous vine. Frequent.

——— (No. 2); a second species. Also an herbaceous vine. More rare.

Justicia (No. 32). The flowers purple. Met with in various places, growing on the banks of streams.

——— (No. 33); a second species.

——— (No. 34). Having a tetragonal spike of yellow flowers. Growing on Mount Corcovado, and also on the Organ Mountains.

——— (No. 35); a fourth species.

Plumbago (No. 6). The fruit very viscous. Growing near the bay shore.

Pisonia (No. 2). A shrub with smooth, tender and somewhat ornamental foliage, and smooth fruit; in these respects agreeing with all the species we met with in Brazil. Rather frequent.

——— (No. 3); a second species. A shrub; rather frequent.

——— (No. 4); a third species. A shrub.

——— (No. 5); a fourth species. Also a shrub.

Boerhaavia (No. 11). Not very often met with.

Verbascum blattaria?. Naturalized.—The variety of Northern plants that had established themselves and were growing spontaneously in the environs of the city, seemed surprising: yet they were neither abundant, nor in a very thriving condition. Indeed, weeds in general did not appear to be very troublesome.

Capraria (No. 1).

Scoparia (No. 1; bis environs of Manila). Frequent.

Leonurus Tataricus? (bis Manila). A frequent weed in cultivated ground. Introduced.

Leonotis (leonurus?; bis Cape Town in Austral Africa). Growing in waste ground, within the limits of the city. Introduced.

Philoxerus (No. 1). Maritime; covering extensive tracts on the sands of the sea-shore.
——— (No. 2). Maritime; in company with the preceding species, covering extensive tracts on the sands of the sea-shore.
———? (No. 3). Erect, and grass-leaved. Maritime; growing in a scattered manner on the sands of the sea-shore.
Chamissoa? (No. 1; compare Aerua introduced?).
———? (No. 2).—Except along the sea-shore, *Amaranthaceæ* were rare.
Rivina (No. 1). Growing on rocks, along the bay shore at Praya Grande.
Phytolacca (No. 4). On burned tracts, "frequent," Brackenridge.
Salicornia (No. 9). In salt marshes, abundant.
Begonia (No. 4). Abounding in the dripping forest on the Estrella Peak of the Organ Mountains, at the elevation of 3500 to 4000 feet.
——— (No. 5). Several other species met with; confined in general to moist, shady situations in the forest.
Coccoloba (No. 1). A shrub, devoid of any marked peculiarity; the leaves not orbicular. Submaritime; growing on the sands along the sea-shore.
——— (No. 2); a second species.
Laurus (No. 13). A tree of medium size. At Tijuca; rare, once only met with.
——— (No. 14); a second species.
——— (No. 15); a third species.
Aristolochia labiosa, (No. 7). The flowers having a fetid odor. Seen only along the Piedade road, where it was frequent (as far as the base of the Organ Mountains).
——— (No. 8). Small-flowered. Rare.
Pedilanthus (No. 1).
Dalechampia (No. 2). An herbaceous Passiflora-like vine.
Tragia (No. 2). An herbaceous vine.
——— (No. 3); a second species.
Jatropha (No. 2).
——— (No. 3). Having hispid leaves, and small flowers.
——— (No. 4); a third species.
——— (No. 5); a fourth species.
——— (No. 6); a fifth species.
——— (No. 7); a sixth species.
Croton (No. 5). A spreading tree, forty feet high, with the trunk a foot in diameter; the leaves large. Beyond the Organ Mountains.
——— (No. 6). A smaller tree.
——— (No. 7). A shrub.
——— (No. 8); a fourth species. A shrub.
——— (No. 9); a fifth species. A shrub.
——— (No. 10); a sixth species. A shrub.
——— (No. 11). Herbaceous, and might at first be mistaken for an Amaranthus. Indeed, most of the Brazilian Crotons seemed congeneric, and somewhat Amaranthiform.

Verbena Bonariensis? (No. 10). Growing in hedges; and apparently, not indigenous in the environs of Rio Janeiro.

Phyllanthus (No. 25). A shrub, about six feet high; ornamental from the foliage, the leaves being quite small. Met with beyond the Organ Mountains.

——— (No. 26). "A small species," Brackenridge.

——— (No. 27). Herbaceous.

Urtica (No. 14). Stinging; the leaves coarsely dentate.

——— (No. 15); a second species.

——— (No. 16); a third species.

——— (No. 17); a fourth species.

——— (No. 18); a fifth species.

——— (No. 19); a sixth species.

——— (No. 20); a seventh species.

——— (No. 21); an eighth species. Most of these eight species were large shrubs. No herbaceous species of Urtica met with, as far as recollected at the close of our visit.

Celtis (No. 9). A small tree.

——— (No. 10). A shrub.

——— (No. 11); a third species.

——— (No. 12); a fourth species.

——— (No. 13); a fifth species.

——— (No. 14); a sixth species. These six species, forming shrubs, and some of them small trees, were neither normal, nor perhaps all of them congeneric.

Ficus (No. 44). A lofty tree, with thin board-like buttresses projecting outwards around the base of the trunk. Met with in the forest at Tijuca, also on Mount Corcovado, and on the Organ Mountains.

——— (No. 45). A tree, twenty feet high; the fruit hirsute. Submaritime; growing on the sands of the sea-shore.

——— (No. 46); a third species.

——— (No. 47); a fourth species.

——— (No. 48); a fifth species.

——— (No. 49); a sixth species.

——— (No. 50); a seventh species.

——— (No. 51); an eighth species.

——— (No. 52); a ninth species.

——— (No. 53); a tenth species.

——— (No. 54); an eleventh species. The observed species of Ficus, all attained the dimensions of trees; and several, formed trees of the largest size.

Nov. Gen. (No. 2?). A small tree; the receptacle of the fruit expanding, as in Dorstenia, or like a fig that has been opened and turned outwards. Growing on submaritime sands, near the Lagoa de Peteninga.

Stachytarpha (No. 1; compare Hawaiian Islands, Tongataboo, and Bombay). One of the most abundant weeds, along road-sides, and in other open situations.

Priva (lappulacea; bis Peru and Taheiti). Growing as a weed.

(Volkameria) fragrans. An abundant weed in waste ground; being a counterpart to our Northern Datura stramonium, and possessing a very similar odor.

Mirabilis (compare No. 1 California). Introduced.

Chenopodium. Two or more species naturalized, and growing as weeds around houses.

Dorstenia (No. 1). In the dripping forest on the Estrella Peak of the Organ Mountains, frequent at the elevation of 3500 to 4000 feet.

——— (No. 2); a second species.

——— (No. 3); a third species.

——— (No. 4); a fourth species. The observed species of Dorstenia were in general rare; growing only in moist situations, in the deepest shade; as by the side of mountain torrents.

Cecropia (No. 1). One of the most conspicuous and characteristic trees of the Brazilian forest; very lofty; the trunk slender, smooth, whitish, and somewhat flexuous. Frequent on the Organ Mountains.

——— (No. 2); there seemed to be two species, one with sessile, and the other with short-pedicelled fruit; but the leaves were not critically compared.

——— (No. 3). A young stock only; the leaves hirsute, and extremely large. Growing in the Piedade Gap of the Organ Mountains, at the elevation of about 3000 feet.

Piper (No. 16).

——— (No. 17); a second species.

——— (No. 18); a third species.

——— (No. 19); a fourth species.

——— (No. 20); a fifth species.

——— (No. 21); a sixth species.

——— (No. 22). Having large, Arum-like leaves, and very long spikes. Frequent.

——— (No. 23); an eighth species.

——— (No. 24); a ninth species.

——— (No. 25); a tenth species.

——— (No. 26); an eleventh species.

——— (No. 27); a twelfth species. The observed species of Piper were all shrubs; and the Tribe was ascertained to be exogenous; transverse sections of stems exhibiting a distinct bark, and a few wood-radii, but no concentric rings of growth.

Gen. near Piper (No. 1). A shrub. Growing in the forest.

——— (No. 2; perhaps not congeneric.)

——— (No. 3).

——— (No. 4).

Peperomia (No. 20). A tender, inconspicuous herb; like most or all of the following species.

——— (No. 21). Leaves ovate, acute, of thick fleshy consistence. Growing on rocks, in the vicinity of the sea-shore.

——— (No. 22). Leaves verticillate. Growing on rocks, along the Rio Piabanha.

——— (No. 23). Epidendric; chiefly growing on the trunks of trees.

——— (No. 24); a fifth species. Chiefly growing on the trunks of trees.

——— (No. 25); a sixth species. Chiefly growing on the trunks of trees.

——— (No. 26); a seventh species. Chiefly growing on the trunks of trees.

——— (No. 27); an eighth species. Chiefly growing on the trunks of trees.

Beta vulgaris, (bis Australia, and the United States). Beets for sale in the market.

(Curcas purgans; bis Luzon, Bombay, Zanzibar, and No. 2 Cape Verd Islands); Jatropha curcas of Linn. Planted in hedges and elsewhere; clearly, not indigenous.

Syena (No. 1). Growing in pools, along the Piedade road.

Sagittaria (No. 9). Differing from our Northern species in habit; the result, perhaps in part, of growing continuously unchecked from year to year. Tall, with the lower branches long and verticillate in threes. Frequent in wet places, along the Piedade road.

Alisma? (No. 2).

Lemna. In pools, somewhat rare.

Habenaria (No. 14). Much like our H. herbiola. In the above-mentioned Sphagnous swamp, at the Eastern base of the Organ Mountains, on the Estrella road.

"Vanilla" (No. 1). Herbaceous and climbing; not seen in flower. Rather frequent; more so than the other Orchidaceæ.

Stelis (No. 1).

——— (No. 2); a second species.

——— (No. 3); a third species.

Epidendrum (No. 6). A ground species; growing on the sands along the sea-shore.

——— (No. 7). Growing on rocks, and on the trunks of trees.

——— (No. 8). Growing on the trunks of trees.

——— (No. 9); a fourth species.

——— (No. 10); a fifth species.

——— (No. 11); a sixth species.

"Cattleya" (No. 1). Having large and very showy purple flowers. Epidendric; growing abundantly on the small trees of the swamp on the Piedade road.

"Oncidium" (No. 1).

——— (No. 2). The flowers yellow, and showy. On the small trees of the swamp on the Piedade road.

"Maxillaria" (No. 1). On trees, on the Organ Mountains.

——— (No. 2); a second species.

"Catasetum" (No. 1). Found by Mr. Brackenridge.

——— (No. 2); a second species.

"Cyrtopodium" (No. 1). Found by Mr. Brackenridge.

Burmannia (No. 2). On the Organ Mountains.

"Costus" (No. 1). Showy. Frequent in the forest.

——— (No. 2); "a second showy species," according to Mr. Brackenridge.

Calathea Zebrina, (No. 1); the "velvet plant." At Tijuca; growing wild in the forest, and to all appearance indigenous.

Maranta arundinacea? (No. 1). On rocks, near the sea-coast.

Gen. incert. Scitamin. (No. 1). On the crest of the mountain-ridge visited at Tijuca.

——— (No. 2).

——— (No. 3).

——— (No. 4).

——— (No. 5).

Janipha manihot, (No. 1; bis Zanzibar in Equatorial Africa). Seen only under cultivation.

Ricinus communis, (bis Polynesian Groups, New Zealand, Bombay, Zanzibar, and the United States). Growing spontaneously; but clearly an introduced plant.

Aleurites triloba, (bis Polynesian Groups, and Hindostan). A large tree, planted rather frequently around houses.

Canna (Indica? No. 1); the flowers red. Frequent in the vicinity of the sea; and observed also in inland situations.

——— (No. 2). Sixteen feet high. Growing along the banks of the Rio Piabanha.

——— (No. 3); a third species.

——— (No. 4); a fourth species.

Heliconia (No. 1). Very showy, from its large sword-like spike of scarlet spathes or flower-bracts. Frequent in wettish situations, inundated by small streams in the forest.

Marica? (No. 1). On the crest of the mountain-ridge visited at Tijuca.

Hypoxis (No. 4); resembling our H. graminea, but lower, and less conspicuous. Frequent (in dry, open, long-established clearings).

Crinum (No. 3); the flowers white. In extensive beds, occupying many acres of the submaritime marshes along the Estrella estuary.

——— ; white-flowered, but perhaps distinct from No. 3. Along the banks of the Rio Piabanha, at the end of our excursion.

——— (No. 4). The flowers small, copper-colored. In the salt-marsh at Piedade, rare.

"Amaryllis" (No. 1). Bulbous-rooted and epidendric, growing on the trunks of trees.

——— (No. 2); "a second epidendric species," Brackenridge.

Furcræa gigantea, (No. 1). Met with in wild situations, though for the most part artificially disseminated; stocks sometimes planted in a row, to serve as a hedge.

Smilax (No. 15). Occasionally met with.

——— (No. 16); a second species.

——— (No. 17); a third species.

Dioscorea (No. 10). An herbaceous vine.

——— (No. 11); a second species. An herbaceous vine.

——— (No. 12); a third species. An herbaceous vine.

Bromelia (No. 1). Chiefly epidendric, on the trunks and branches of trees; but like most of the following species, growing sometimes on rocks, and even on the ground.

——— (No. 2). Abounding on the Estrella Peak of the Organ Mountains, especially between the elevation of 3500 feet and the mountain-top.

——— (No. 3). The flowers red.

——— (No. 4). The flowers rose-colored.

——— (No. 5); a fifth species.

——— (No. 6); a sixth species.

——— (No. 7). The flowers yellow.

——— (No. 8); an eighth species.

——— (No. 9); a ninth species.

——— (No. 10). The flowers blue.

——— (No. 11; an eleventh species.

——— (No. 12). Growing on the sands of the sea-shore.

——— (No. 13); a thirteenth species.

Ficus carica, (bis Hindostan, Zanzibar, and the Mediterranean countries); the common fig. The fruit for sale in the market. Seen also under cultivation at March's residence.

——— (No. 55). A single large tree, with branches extending fifty feet outwards, and by a rare exception, horizontal and near the ground. Planted at the residence of Padre Correa, beyond the Organ Mountains, and towards the Rio Piabanha.

Pitcairnia (No. 1).

——— (No. 2); a second species.

Tillandsia (No. 2). Epidendric on the wide-spreading branches of the planted solitary Ficus, at the residence of Padre Correa, beyond the Organ Mountains.

——— (No. 3); a second epidendric species.

——— (No. 4); a third epidendric species.

——— (No. 5); a fourth epidendric species.

——— (No. 6); a fifth epidendric species.

——— (No. 7); a sixth epidendric species.

——— (No. 8); a seventh epidendric species.

——— (No. 9); an eighth epidendric species.

——— (No. 10); a ninth epidendric species.

Pontederia (No. 2). The flowers conspicuously larger than in our P. cordata. Aquatic; growing in shoal water along the margin of the Estrella estuary, and elsewhere.

——— (No. 3); perhaps a second species; the flowers smaller.

Heteranthera (No. 2); resembling our North American species. In pools, frequent.

Dichorisandra thyrsiflora, (No. 2). Ornamental from its bright-colored flowers; and in various localities frequent.

Tradescantia? (No. 2).

Nov. gen. "fuscata," (No. 1); Tradescantia of authors. Depressed and low; the leaves bi-colored, (reddish beneath). In the deep forest.

Commelina (No. 8).

——— (No. 9); a second species.

——— (No. 10); a third species.

——— (No. 11); a fourth species.

——— (No. 12); a fifth species.

——— (No. 13); a sixth species.

——— (No. 14); a seventh species.

——— (No. 15); an eighth species.

——— (No. 16); a ninth species.

——— (No. 17); a tenth species.—*Commelinaceæ* were frequent, and in much variety; but were not critically examined.

Xyris (No. 4). In sphagnous bogs, somewhat rare.

Gen. Palmac. (No. 1). A vine, readily passed by and overlooked; but remarkable for climbing by means of reflexed spines on the prolonged midrib of the fronds. In woods, near the fortress at the entrance to the bay.

Gen. Palmac. (No. 1). Twenty feet high; fronds very large, with long spines on the petiole and midrib. Frequent.

Gen. Palmac. (No. 1). Low; the pinnulæ eroded at the apex. On the Organ Mountains.

Gen. Palmac. (No. 1).

Oreodoxa? (No. 1). Thirty feet high. A stock growing near Magé, on the Piedade road.

Artocarpus incisa, (bis Polynesian Groups, &c.); the bread-fruit tree. Planted.

Salix Babylonica, (bis St. Helena, and the United States). Planted at March's residence, at the Serra do Coito.

Casuarina equisetifolia, (bis Polynesian Groups, and the East Indies). Planted around houses.

Palm. incert. (No. 1). Thirty feet high; the fronds radiating in all directions, downwards, upwards, and laterally. Frequent.

Gen. Palmac. (No. 1); thirty feet high; the fruit much resembling a grape, and having a pulpy coating with a thin skin. Frequent along the Piedade road; the bunches of fruit collected, and offered for sale in the market.

Gen. Palmac. (No. 1). Stemless; the fruit dry (not pulpy), disposed in a spike. On submaritime sands along the sea-coast, rather frequent.

Gen. Palmac. (No. 1); in flower at the time of our visit. The trunk about thirty feet high. Submaritime, growing on the upland.

Gen. Palmac. (No. 1). Twenty feet high, with the trunk rather slender, and the fronds slightly pendent. Submaritime; growing in a scattered manner throughout the mangrove swamps of the Estrella estuary.

——— (No. 2).

——— (No. 3).

Gen. Palmac. (No. 1). Thirty feet high; the fruit somewhat resembling an oak-apple, being roundish, an inch and a half in diameter, and covered with a dry shell. Observed along the Piedade road; the fruit collected and offered for sale in the market.

Palm incert. (No. 1). Slender-stemmed, five feet high. Abounding on the crest of the mountain-ridge visited at Tijuca.

——— (No. 2). Slender-stemmed, five feet high. Growing on the summit of the Estrella Peak of the Organ Mountains.

——— (No. 3). Slender-stemmed, five feet high. Abounding on the crest of the Organ Mountains, visited from the residence of Padre Luiz.—Nearly all of these sixteen Palms were identified in Martius's Work, which I examined at Rio Janeiro; but as I took no notes at the time, I am unable now to quote their names.

Typha (No. 5). Seeming a peculiar species. Abounding in the submaritime marshes along the Estrella estuary; observed also at the Lagoa de Freitas.

(Colocasia No. 5); Caladium of authors.

(——— No. 6); Caladium of authors. The leaves very large, measuring three feet by two, not including the petiole. Frequent on the Organ Mountains.

Caladium hederaceum, (No. 1). Forming a shrub, its slender, upright stem being woody and six feet high; the leaves hastate. Abounding on submaritime sands, and on steep, rocky acclivities exposed to the sea; also met with in one locality far inland, beyond the Organ Mountains. (A transverse section of the stem presented no traces of wood-radii).

——— (No. 2); a second species.

——— (No. 3); a third species.

Alpinia. "Globba" of authors. Introduced.

Musa paradisiaca, (bis Polynesian Groups, East Indies, Hindostan, Zanzibar, and Egypt); the banana. Abundantly cultivated in the district between the sea and the Organ Mountains. At the elevation of "3100 feet" in the Piedade Gap, Mr. March had been unable to succeed with the banana, the fruit proving uniformly worthless.

Dracæna terminalis, (bis Polynesian Groups, and the East Indies). In gardens.

Ananas (No. 1; bis Polynesian Groups, East Indies, Zanzibar, Australia, &c.); the pine-apple. Met with only on the sands of the sea-shore.

(Monstera) pertusa, (No. 1); Dracontium of authors. Occasionally met with.
——— (No. 2); a second species.
——— (No. 3); a third species.
——— (No. 4); a fourth species.
——— (No. 5); a fifth species.
——— (No. 6); a sixth species.
Pothos (No. 9). Twining around the trunks of trees in the forest.
——— (No. 10); a second twining species.
——— (No. 11); a third twining species.
——— (No. 12); a fourth twining species.
——— (No. 13); a fifth twining species.
——— (No. 14); a sixth twining species.
Gen. near Pothos (No. 1). Stemless; the leaves oblong-lanceolate, three or four feet in length, firm, inflexible, and remarkable for their thickness. Submaritime; growing among rocks, along the sea-shore.
Gen. Pothos-like (No. 1). Stemless, with a dark-colored spathe.
——— (No. 2); a second species. Epidendric, and very small; stemless, with a dark-colored spathe.
Gen. incert. (No. 1); the "cipo d'imbe." On the Organ Mountains, and only once met with; long cord-like radicles hanging nearly to the ground from a tree-top, from a distance too great for their origin to be distinguished.
Juncus (No. 34). Articulated. Rare, met with in but one locality.
Cyperus (No. 39). The species of Cyperus various and abundant, often occupying almost exclusively the fresh-water marshes; but they were not critically examined.
Papyrus (No. 2). Large and conspicuous. Subaquatic; growing in drowned land, along the Piedade road.
Scleria (No. 19). Stem weak, almost scandent, ascending full thirty feet among the branches of small trees. In the swamp beyond Magé, on the Piedade road.
——— (No. 20). Several normal species were met with, growing exclusively on the upland, in dry ground.
———? (No. 21). Some abnormal species also met with; forming apparently one or more distinct genera.
Rhynchospora (No. 11).
Fuirena (No. 5). In the Sphagnous bog, at the Eastern base of the Organ Mountains, on the Estrella road.
Fimbristylis (No. 14). Maritime?.
Eleocharis (No. 16). One or more species, much resembling our Northern ones.
Gen. Scirpeæ (No. 1); a peculiar form, somewhat Dulichium-like. One or more species.
Pharus (No. 1).
Paspalum (No. 10). And one or more additional species. The grasses most frequently met with; and abounding especially in established clearings, belonged to the two genera of Paspalum and Panicum.

Cocos nucifera (No. 1; bis Polynesian Groups, to the East Indies, Hindostan, and Zanzibar). Spoken of as planted in the Botanic Garden, or at some spot in the vicinity of the city; but not seen by myself.

Olyra (No. 1).
Panicum (No. 38). Also, a second and several additional species.
Orthopogon? (No. 3).
(Stenotaphrum? No. 1); Rottboella of authors. Maritime; thinly scattered, and almost the only grass on the sands of the sea-shore.
Cynodon dactylon? (compare Polynesian Groups, New Zealand, Australia, Hindostan, and Upper Egypt.).
Chloris? (No. 8).
Gen. Bambusa-like (No. 1). The stem brittle and weak, giving out a whorl of branchlets at each joint, and ascending high above the tops of the tallest trees. Frequent throughout the forest, to the elevation of 5000 feet on the crest of the Organ Mountains, visited from the residence of Padre Luiz.
——— (No. 2); a second species. Frequent.
Gen. Bambuseæ? (No. 1). A climbing, strong-stemmed, reedy grass, tangling the undergrowth in abandoned clearings. Troublesome in various localities, especially on the crest of the Organ Mountains, near the residence of Padre Luiz.
Salvinia (No. 1). The floating tufts frequent on the surface of the Estrella estuary.
——— (No. 2); apparently a second species. The floating tufts interspersed among those of the preceding species in the Estrella estuary.
Azolla (compare No. 2 California). Abundantly floating on the surface of pools.
Psilotum? (compare Paumotu Coral-archipelago to Feejee Islands and Zanzibar).
Lycopodium (No. 47). Somewhat dendroidal, or like a very young Juniperus.
———(No. 48). Resembling our L. Carolinianum. In small Sphagnous bogs among the Organ Mountains, on the Piedade road.
——— (No. 49). Resembling L. apodum. Also, a fourth and other additional species.
Ophioglossum (No. 5).
Marattia (No. 2).
Dicksonia (No. 24).
——— (No. 25). A tree fern; yet seeming a congener of our D. pilosiuscula.
Acrostichum aureum, (bis No. 2 Taheiti to Feejee Islands, Mindanao, and Zanzibar). Growing in large tufts among the mangrove swamps along the Estrella estuary.
Polybotrya (No. 5).
——— (No. 6); a second species.
——— (No. 7); a third species.
——— (No. 8); a fourth species. Scandent?
Gymnogramma (No. 2).

Mariscus (No. 6. Whether indigenous, or otherwise, not recorded).
Kyllingia (monocephala?; compare Peru, Polynesian Groups, East Indies, and St. Helena). Inconspicuous, but rather frequent.
Oryza sativa, (bis Luzon to Hindostan and Zanzibar); rice. Sparingly cultivated, once only met with.
(Panicum frumentaceum?). A kind of grass was spoken of as cultivated; bearing the name of "Guinea grass," and said to have been brought from Africa.
Saccharum officinale, (bis Metia and the Hawaiian Islands to Hindostan and Zanzibar); the sugar cane. Very sparingly cultivated.

Polypodium, (No. 50). Epidendric; the frond simple, six feet in length.
——— (No. 51). Also, a third and several additional species.
Adiantum (No. 27).
Pteris (No. 43). Habit of P. aquilina, but very tall, twelve feet or more in height.
——— (No. 44). In the marshes of the Estrella estuary?, besides other localities.
——— (No. 45). With a fourth and other species, various in habit.
Blechnum (No. 9). The fronds very large.
——— (scandens, No. 10; see Voyage of the Coquille. t. 36). Climbing.
Lomaria? (No. 9).
Vittaria (compare Polynesian species).
Aspidium? (No. 32).
Aneimia (No. 1).
——— (No. 2); a second species.
——— (No. 3); a third species. And perhaps a fourth.
Osmunda regalis? (compare No. 1 Italy, and the United States). In the Sphagnous bog at the Eastern base of the Organ Mountains, on the Estrella road.
Marchantia (No. 7); seeming a peculiar species. And perhaps others.
Jungermannia (No. 29). Also, a second, and several other species.
Sphagnum (No. 4; compare sp. of the United States). Occupying various distinctly marked bogs, among the Organ Mountains.
Musci incert. Mosses, of various genera, abundant.
Lichenes. Species met with in the forest.
Fungi. Perhaps rare.

2. The Brazilian Mountain-Region.

In ascending the mountain peak forming the Northeastern side of the Estrella Gap, the acclivity soon became steep, and the woods, under a clear sky, more dripping wet than I had elsewhere witnessed; owing in part, amid the shade, to the profusion of Bromelias storing moisture in their sheathing leaves, and the springs everywhere gushing forth. Dorstenias now made their appearance, and especially a variety of Begonias and other ornamental plants, not previously met with. After scaling several ledges that would have been inaccessible but for the projecting shrubs and trees, I at length succeeded in reaching the summit. This, though distinctly pointed, was covered with trees; all of them stunted and gnarled from mountain exposure, and only thirty feet or so in height. On climbing one, to get a view of the surrounding country, a range of higher summits was disclosed to the Eastward; and at the same time I obtained an exemplification of the inexhaustibleness of the Brazilian flora: without even changing foothold in the tree-top, I gathered no less than six species of

plants that we did not meet with elsewhere; three of them flowering trees whose branches happened to interlace, and three different species of mistletoe, or *Phoradendron?*

The Boa Vista Peak, forming the Southwestern side of the Piedade Gap, was ascended by Mr. Brackenridge and myself; and the summit was found to be less pointed, while the trees growing on it did not seem at all dwarfed, notwithstanding a good deal of exposure.

At an intervening locality, on the crest of the main mountain ridge visited from the residence of Padre Luiz, there seemed again to be no decided change in the forest; as to the height of the trees, or the composition of the vegetable growth. But in neither of these three excursions were we probably at a greater elevation than five thousand feet.

The highest Peak of the Organ Mountains, as pointed out and seen from different directions, appeared to be more than seven thousand feet in elevation. Mr. March informed me, that the English botanist, Gardner, by following paths of the anta or tapir, succeeded in getting within a few hundred feet of the summit; amid "*Vacciniums*, a *Viola*, and a vegetation resembling in several particulars that of temperate climates."

In the course of my botanical experience, I have often found genera of temperate and cool climates traceable to mountains, even where not occurring precisely on their summits. On reviewing, therefore, our excursions in Brazil, I am inclined to regard some of the plants we met with as having claims to be admitted into the mountain-region: as, a *Goodyera*; two species of *Carex;* a *Scutellaria;* an evergreen, small flowered *Cerasus;* the frequent *Rubus;* three species of *Sisyrinchium;* an *Epilobium;* a *Fuchsia;* a *Galium;* a tall herbaceous *Rumex;* two small herbaceous *Hypericums;* a *Ranunculus;* an example of the Gentian Tribe in *Lisianthus;* a *Mutisia;* an *Alstrœmeria;* the scarlet-flowered *Salvias;* and the *Araucaria.*

Boreal Analogies. Of these genera, several will be observed to be properly Northern; as *Cerasus*, *Eupatorium* proper, *Erigeron*, *Vaccinium*, *Salvia*, *Habenaria*, *Goodyera*, *Xyris* perhaps, and *Osmunda.* One remarkable instance of North American analogy was also met with:

Bogs, inundated with cool spring-water, and covered over with Sphagnum, perpetually wet and sponge-like, preserve a very equable temperature in the warmest climates. At the base of the Organ

Mountains, the luxuriant forest gave place to an open Sphagnous bog; over a surface of some acres, presenting a strange local resemblance to far-distant New Jersey: among the usual Cyperi, some *Scirpeæ* and a *Fuirena* were now intermingled, also some grasses; with here and there a *Habenaria*, closely resembling our Northern H. herbiola; a *Xyris;* a normal herbaceous *Eupatorium;* a *Cuphea;* a *Hedyotis;* the *Osmunda regalis; Jussiæas*, taking the place of our Northern Ludwigias; the *Sauvagesia*, in place of our Northern Lysimachias; two or three *herbaceous Melastomaceæ*, corresponding to our Northern Rhexias; and a showy *Rhinanthoid* plant. The resemblance was heightened by the aquatic plants of the neighborhood, as *Utricularia*, *Heteranthera*, and *Pontederia;* and by the *Smilax* vines on the adjoining upland. Other Sphagnous bogs on and among the Organ Mountains, contained one or more of the same species of plants; but nowhere so assembled, as to again present this local resemblance.

Independently of bogs, we met with one genus of temperate climates, whose presence could not be traced to mountains: the *Hypoxis*, growing in the most sunny openings; a locality, however, partly artificial, a result of the removal of the forest.

Austral Analogies. On the other hand, several of the genera we met with in Brazil will be observed to be Austral, belonging properly to the temperate and cool portion of the Southern Hemisphere: as *Mutisia*, and *Alstrœmeria; Belangera*, the frequent and showy Cunoniaceous tree; a *Fuchsia*, growing on the Organ Mountains; as also a lofty *Araucaria*, representing there the pine tribe.

By a parallel exception to those mentioned above, the presence of one Austral genus could not be traced to mountains: the *Acicarpha*, belonging to the *Calyceraceæ*, an Austral-American tribe, but a maritime plant, confined exclusively to the sands of the sea-shore.

The following List includes all the plants we met with in Brazil, that seemed in any degree connected with or appended to the Mountain-Region:

Ranunculus (No. 22). A small species, observed by Mr. Brackenridge, "growing near March's residence."

"Viola" (No. 27). A species said to have been found by Gardner, "within a few hundred feet of the highest summit of the Organ Mountains."

Hypericum (bis No. 16). Growing by the road-side, beyond the Organ Mountains.

——— (bis No. 17).

Rubus (bis No. 28). Frequent from the coast to the Organ Mountains.

(Laurocerasus? No. 2). Cerasus; a small tree; the flowers small, and inconspicuous. In the Piedade Gap of the Organ Mountains, growing near the residence of Mr. March, "3100 feet above the sea."

"Epilobium" (No. 18). A species met with by Mr. Brackenridge, "on the Organ Mountains."

Fuchsia (No. 1). Arborescent, becoming a tree sometimes "over twenty feet high, with the trunk six inches in diameter." Growing on the Organ Mountains.

Belangera speciosa, (bis No. 1 Brazil). Growing in the mountainous district around the city, and also on the Organ Mountains.

(Phoradendron, No. 4). Viscum of authors. Parasitic on the gnarled trees that cover the apex of the Estrella Peak of the Organ Mountains, 4500 feet or so above the sea.

(———? No. 5). Parasitic in the same locality, interspersed with the preceding species on the same tree-tops.

(———? No. 6); the leaves alternate. Parasitic in the same locality, interspersed with the two preceding species on the same tree-tops.

Galium (No. 18). A small species. Growing on dry road-side banks, in the district beyond the Organ Mountains.

"Rubia" (No. 2). "Beyond the Organ Mountains," Brackenridge.

Mutisia, (bis No. 1 Brazil). Growing at Tijuca; but perhaps belonging properly to the mountain-region.

Eupatorium, (bis No. 10 Brazil). Growing in the above-mentioned Sphagnous bog; but perhaps properly belonging to the mountain-region.

Erigeron (No. 12). Much like E. bellidi(folium).

——— (No. 13); a second species.

"Vaccinium" (No. 24). According to Mr. March, one or more species of Vaccinium were found by Gardner "within a few hundred feet of the summit of the highest peak of the Organ Mountains."

Lisianthus (bis No. 1 Brazil). In the Estrella Gap of the Organ Mountains; growing in the deep forest, rare.

Rhinanthus? (bis No. 3 Brazil). Growing in the above-mentioned Sphagnous bog; but perhaps properly belonging to the mountain-region.

Salvia, (bis No. 5 to 8 Brazil). The four scarlet-flowered Salvias met with, are perhaps to be regarded as properly mountain plants.

Scutellaria (No. 8). In the Piedade Gap of the Organ Mountains, at the elevation of about 3100 feet.

Plantago (No. 22); resembling our P. Virginica, but perhaps distinct. Occasionally met with along road-sides beyond the Organ Mountains; seemingly indigenous.

Rumex (No. 17). Herbaceous and rank-growing, very tall, being sometimes ten feet high. On the banks of a stream, beyond the Organ Mountains.

Araucaria (No. 1). A tree, a hundred feet high, straight, and having the same general outline as most of the pine Tribe; but the branches somewhat candelabra-like, with clustering leaves chiefly confined to the terminal branchlets. About twenty scattered stocks, conspicuous at a long distance, were seen in and beyond the Estrella Gap of the Organ Mountains; and Mr. Brackenridge remarked, that they seemed to be "looked upon by the people with a sort of respect."

Habenaria, (bis No. 14 Brazil); much like our Northern H. herbiola. Growing in the above-mentioned Sphagnous bog; but perhaps properly belonging to the mountain-region.

Goodyera (No. 6). Much like our G. repens; the leaves variegated. On the upper portion of the Organ Mountains, not far from the residence of Padre Luiz, rare.

Sisyrinchium (No. 7). In the Piedade Gap of the Organ Mountains, near the residence of Mr. March, "3100 feet above the sea."

——— (No. 8); a second species. The flowers pale-yellowish.

——— (No. 9); a third species.

Marica? (bis No. 1 Brazil). Growing on the crest of the mountain-ridge visited at Tijuca.

Alstroemeria (No. 1). About a mile beyond the residence of Padre Luiz, on the Northwestern slope of the Organ Mountains, rare.

Xyris (bis No. 4 Brazil). In Sphagnous bogs, among the Organ Mountains; somewhat rare.

Juncus (bis No. 34 Brazil); articulated. Met with in only one locality.

Carex (No. 76); normal. On the upper portion of the Organ Mountains, not far from the residence of Padre Luiz, rare.

Gen. near Carex (No. 1); apparently a distinct genus. On the upper portion of the Organ Mountains, not far from the residence of Padre Luiz, rare.

Eleocharis (bis No. 19 Brazil). In Sphagnous bogs, among the Organ Mountains.

Lycopodium (bis No. 48 Brazil); resembling our L. Carolinianum. In Sphagnous bogs, among the Organ Mountains.

Osmunda regalis? (bis No. 1 Brazil). Growing in the above-mentioned Sphagnous bog; but perhaps properly belonging to the mountain-region.

Sphagnum (bis No. 4 Brazil). Occupying the bogs at the base of and among the Organ Mountains; some we met with being at the elevation of at least 3100 feet.

CHAPTER V.

AUSTRAL-AMERICAN REGIONS.

Leaving Brazil on the 7th of January, 1839, the Vincennes and other vessels of the squadron proceeded South; and on the 25th, anchored at the mouth of the Rio Negro, at the Northern extreme of Patagonia.

1. Patagonia.

Our Latitude was now about 41° South, and the change in the character of the country could not be more complete. Before us, was only a continuous low line of land, devoid of trees, arid and brown. By closer inspection, undulating sand-hillocks were distinguished; extending as far as three miles south of the river-mouth, where a well-defined bluff comes out to the sea.

Afterwards, on landing, this bluff, about a hundred feet high, was found to mark the real elevation of the whole country: for we looked out upon a naked, endless plain, where the sun goes down as it does upon the ocean, intercepting in the distance only some very slightly-swelling variations of level. The sand-hillocks in front of our anchorage, were now perceived to occupy a wide river-trench; formed by the vast body of flowing water in wearing a passage through this upland plain.

The geological structure was in various places manifest; a *tertiary sand-rock*, horizontally stratified, usually crumbling between the fingers, but in some layers seeming sufficiently indurated for building purposes. Mr. Dana remarked "a considerable mixture of lime in the upper stratum;" and was informed, that "lime is procured by burning." The included fossils were all found to belong to the most recent geological Period.

The river-brink at first appeared gravelly, but was found to consist

chiefly of small pebbles, as smooth as though sea-worn; some of them porphyritic, and a few quartzose; and for the most part, derived evidently from a distance.

The country is usually termed "a Desert;" but in place of the soil remaining bare, the plants seem to have been adapted by extreme structural modification to resist intense and long-continued drought. Besides roots deeply penetrating, the twigs or branchlets of the shrubs are very generally spinescent, bearing hard coriaceous foliage; with a tendency in the leaves to become diminutive, not witnessed in any other part of the Globe I have visited.

All over the country, scattered bushes were in general frequent, eight feet in extreme height, and always growing isolated; branching from the base, and with a general stunted aspect, presenting all around rigid, dense, impenetrable branchlets, rendered unsightly by the paucity and smallness of the leaves. One frequent shrub, belonging to the *Labiatæ*, had its coarse blackish branches seemingly devoid of leaves; these on closer inspection being found reduced to mere herbaceous granules.

The nearest approach to a tree was a sort of agglomerated shrub; having in one instance a trunk a foot in diameter, that after rising only two inches, separated into some thirty stems, the total elevation being that of the surrounding shrubs.

In the course of an excursion over the "campos" or upland plain, I experienced the difficulty mentioned by travellers, of forming a correct estimate of the size and distance of objects; there being no means at hand of forming comparisons. A seeming tree in the distance, proved on reaching it to be only a signal-bush; changed in outline by the lower branches being trimmed off, but of the same height with the other bushes of the plain; which in general did not reach above the shoulders of a man walking among them.

The soil on the "campos" was observed to be a mixture of clay and small pebbles, firmly impacted, destitute of decayed vegetable mould, and in great part bare. This, with the hoariness of much of the scattered herbage, and the scanty foliage on the shrubs, may account for the absence of refreshing green in the landscape; the color of the country, clothed with plants in flourishing condition, being distinctly brown, according very nearly with that of our withered New England pastures in November.

In the extensive tract of sand-hillocks above-mentioned, the soil

was more loose and drifting, the roots of plants seeming to penetrate more deeply, and various species made their appearance, not met with on the Upland plain; but the general character of the vegetable growth continued unchanged.

The eye in botanizing was now relieved from looking upwards, and readily scanned an acre at a time; but the aspect of the vegetable growth was strange; there was difficulty in realizing that this was part of America; and it was through reasoning and research, that I at length obtained evidence of the fact. Characteristic American Tribes of plants were after a while detected, as *Cactaceæ*, *Grindelia*, *Baccharis*, and *Oenothera;* all however comparatively rare, so thinly scattered as to be out of sight amid the general vegetable growth.

Climate. The 27th and 28th were spent on shore, where the weather was oppressively warm; the overheated plain accounting for the reaction which ensued, in a thick fog on the 30th, and a South-eastern gale on the 31st: the latter so violent, that the vessels were compelled to put to sea, and could only return in the evening.

On the morning of the 30th, the weather as yet being clear, I landed with Dr. Fox; who found the temperature of the sand, at the depth of three feet below the surface of the sand-hillocks, to be 74° Fahr.

On the 1st of February, I landed for the third and last time; and a strong, cool wind blowing in from the sea, I found the temperature throughout the afternoon varying very little from the average of 73° Fahr. I spent three-quarters of an hour in an artificial cave, deep enough for reliable observations on the mean annual temperature: the result obtained was 70° Fahr., which, as the country is devoid of true winters and of the shade of trees, may not much exceed the real mean.

According to the testimony of residents: "ice is hardly known;" and during the "last four years, snow had fallen but once," on which occasion, as in all previous instances, it "disappeared within twelve hours." Indeed, the scarcity, almost entire absence of deciduous foliage, affords direct proof of the absence of real winters.

Rain, however, must sometimes fall; as was shown by a distinctly-marked dry bed of a torrent, and by the margin of the Upland plain being more or less worn into short ravines, apparently by the action of running water. The plants, too, seemed to have their seasons; flowers and ripe fruit being seldom seen side by side upon the same

stock. A large proportion of the grasses were withered, and withered vestiges of annual plants were also met with.

After rains, when the *annual plants* spring up, the country may be somewhat greener: and even *bulbous-rooted* plants may at that time make their appearance. Indeed, we met with two fine ornamental species of *Habranthus*, belonging to the *Amaryllideæ;* and most unexpectedly, with relics of a showy Arethusa-like *Orchideous* plant.

Character and Composition of the Vegetable Growth. Throughout the tract of sand-hillocks and the Upland plain, nine-tenths of all the vegetable growth appeared to consist of two families of plants; *Compositæ*, and *Graminaceæ* or grasses:

1. *Compositæ* were dominant. Several of them presenting a striking resemblance to the Ulex and Genistas of Europe; one *Chrysocomoid* genus having its aphyllous green branches similarly used for brooms. Among the many dissimilar Labiatifloral Compositæ, some that were Gnaphalium-like, with yellow, unfading calyx-scales, might be mistaken for the showy Helichrysums of Austral Africa. One of the most ornamental and frequent plants was the *Hyalis argentea*, silvery white, with leaves obliquely twisted, some of its pleasing flowers being rose-colored and others white. Among other genera that were new to me, was one that might have been mistaken for *Erigeron*, except that its large flowers were yellow.

2. *Graminaceæ*, or grasses. Nowhere presenting the freshness of our Northern pasture grasses, but hard and dry in consistence; as *Aristida*, *gen. Aristidoid* resembling a slender Cenchrus, *Andropogon*, *Apogonia*, *Ceratochloa*, *Agropyrum*, *Elymus*, a *congener* of our North American Polypogons, and a *Psamma-like* genus somewhat resembling Anthoxanthum.

3. *Leguminosæ*. Among the remaining families of plants, next in the order of frequency. Including among other ornamental species several large shrubs, and even three *Mimoseæ:* one of the large shrubs, by a remarkable exception, having deciduous foliage. Among the most characteristic Leguminous plants were the different species of *Adesmia*.

4. *Salsolaceæ*. Possibly to be ranked among the prevailing Tribes of plants; if the maritime species be included. Various species were, however, frequent on the Upland plain; one of them being a shrub with linear succulent leaves.

Of plants belonging to other Tribes, the following, being either abundant or remarkable, seemed worthy of special notice:—The *Margyro-*

carpus, one of the most frequent and characteristic plants.—A variety of slender-leaved *Plantagos*.—Two or three *Malvaceæ*, having much of the aspect of Potentillas.—A *Portulaca*, conspicuous at a long distance from the brilliancy of its large reddish-purple flowers.—Some very delicate ornamental plants; as a slender *Polygala* having the habit of our Polygonellas; and an *Oxalis* with leaves cloven into two slender lobes, like horns.—*Cactaceæ*, rare and singularly inconspicuous in the landscape, but presenting some remarkable species; as an *Opuntia* having its stem-joints ovoid or egg-shaped; a species having cylindrical stem-joints; a *Melocactiform Cereus*, sometimes compound or agglomerated; and a *Mamillaria?* with flattened apex even with the surface of the soil, so as, except where growing in companies, readily to elude observation.—But of all the vegetable productions, the most singular was a *Mulinum*, an Umbelliferous plant that although herbaceous, seemed to emulate the spinescence of the shrubs; with leaves like trifid spines, and resistant interlaced stems and branches, converted into a sort of impenetrable green bunch.

In the midst of the all-pervading structural modification, two species of plants, an *Asclepias* and a *Larrea*, continued normal; maintaining their large freshly-herbaceous leaves, as though insensible of any prevailing drought. The *Asclepias* being, therefore, an exact counterpart to the A. (Calotropis) gigantea of the Cape Verd Islands and Oriental Desert; the *Larrea* proving, at the same time, to belong to a genuine Desert-tribe of plants, the *Zygophyllaceæ*.

The infiltrated ground. In striking contrast with the adjoining upland, the marshy ground on either side of the river was thickly-clothed and green with herbage: but the plants, belonging to Tribes that occur in similar situations elsewhere, were comparatively uninteresting. *Scirpus lacustris?* was here intermingled with reeds; as a *Deyeuxia*, conspicuous from its large silver-white panicles, and a *Phragmites*. The intervening spaces being occupied by a more humble growth of Glumaceous or grassy plants; as *Scirpeæ*, two species of *Carex*, some saline grasses, as *Uniola* and *Spartina*, and two species of *Juncus;* while here and there, and along the margin, other herbaceous plants were met with, as a *Sisyrinchium*, a minute-flowered *Lythrum*, a *Samolus*, a *Limosella*, a *Tillæa*, two species of *Hydrocotyle*, an *Apium*, two species of *Eryngium*, and a Gratiola-like but ornamental *Gerardia*. A dead tree, fifty feet by two feet in diameter at base, had floated down the river, bringing entangled the living branch of a *willow;*

giving evidence, therefore, of standing trees on the river-bank at no very great distance, nearer, in all probability, than the base of the Andes.

Negative characters. As in other Desert and excessively arid countries, *Cryptogamous plants* were exceedingly rare, almost wanting: the aquatic *Azolla* was indeed abundantly floating in the river; but on the land, there were no signs of Ferns; and only once was a *Lichen* met with, growing in tufts on the stem and branches of a single shrub.

The following Tribes and Families of plants were not met with in our excursions:

Ranunculaceæ,	Crassulaceæ,	Nyctaginaceæ,
Berberidaceæ,	Ficoidaceæ,)	Lauraceæ,
(Papaveraceæ,	Saxifragaceæ,	Thymeleaceæ,
Capparidaceæ,)	(Escalloniaceæ,	Elæagnaceæ,
Violaceæ,	Cunoniaceæ,	Aristolochiaceæ,)
Cistaceæ,	Araliaceæ,	Urticaceæ,
Hypericaceæ,	Valerianaceæ,)	(Hypoxidaceæ,)
(Ampelidaceæ,	Campanulaceæ,	Smilaceæ,
Linaceæ,	(Lobeliaceæ,)	(Liliaceæ,
Geraniaceæ,	Ericaceæ,	Melanthaceæ,
The Tribe Phaseoleæ,	(Epacridaceæ,)	Bromeliaceæ,
The Tribe Pomaceæ,	Gentianaceæ,	Commelinaceæ,)
Melastomaceæ,	(The Tribe Convolvuleæ,	Araceæ.
Myrtaceæ,	The Tribe Antirrhineæ,	
Cucurbitaceæ,	Orobanchaceæ,	

The absence of Ericaceæ and Epacridaceæ in an Austral region, at first seems remarkable; but may perhaps be accounted for under the extreme aridity, by the entire absence of that spongy bog-like soil, which is so prevalent over upland and lowland, wet or dry, in most parts of the Southern Hemisphere.

The specimens collected at the mouth of the Rio Negro, after being prepared, were reviewed jointly by Mr. Brackenridge and myself; when, with the living plants fresh in memory, as we examined the specimens, I wrote down a List, including, as far as they could be recalled, all the species we observed. The same plan was kept up afterwards, throughout the remainder of the voyage.

The transfer of the Lists to my Journal, usually after some days or even weeks, was yet made before the living plants had faded from my memory. The species were now entered in botanical order, according

to the Families: but in confining the record to a single line of description, the original notes were often abbreviated; a portion being omitted, while in other instances, further details were added.

The following plants were found growing around the mouth of the Rio Negro in Northern Patagonia:

"Cheiranthus?" (No. 1). Vestiges observed by Mr. Brackenridge; but the specimens lost before they could be critically examined.*

Lepidium (No. 9). On the tract of sand-hillocks, between the water-line and the Upland plain; possibly only naturalized.

Polygala (No. 20). Having much of the aspect of a Polygonella. On the tract of sand-hillocks, rare.

Silene (No. 14). Annual. On the tract of sand-hillocks, and elsewhere.

Spergularia (No. 5; compare No. 3 North California). Stipules; and a large woody root.

(Palavia, No. 1; see Lamarck, 577, 2). Prostrate; the flowers large, with a two-leaved outer calyx.

(Modiola reptans, St. Hil.; No. 1); gen. Malvac. Potentilliform; the leaves dissected; the flowers devoid of an outer calyx; the petals red.

Melochia (No. 1). The flowers very small.

Oxalis (bipartita, St. Hil.?; No. 21). The leaflets so deeply divided as to appear each two-horned. Rare.

(Larrea, No. 1); gen. Zygophyllac. A (large) bush, frequent on the "campos" or Upland plain.

Gen. Celastrac.? (No. 1). Colletia-like; a spiny shrub; the leaves fasciculate, ovate, entire, pointed.

Gen. Celastrac.? (No. 1). A shrub; the leaves perennial, verticillate, ovate-lanceolate, crenate, Euonymus-like.

Condalia? (No. 1). A spiny shrub; the leaves alternate, obovate, entire; the calyx of five deciduous sepals; the stamens five; the drupe oblong, hard, and coriaceous.

(———? No. 2). A shrub; the leaves larger, obovate, entire; the berry round, containing a single hard seed, that bears some resemblance to the fruit of an Umbelliferous plant.

Gen. Legum. (No. 1). A large shrub; with deciduous leaves; and a thick fleshy pod. Frequent.

Gen. Legum. (No. 1). Habit of Galega; the flowers purple; the pod moniliform, three-seeded. Frequent.

Astragalus (No. 16; perhaps a congener of Phaca villosa of our Southern States?). Annual. Growing on the tract of sand-hillocks.

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* The plants that accompany the footsteps of man, do not in general well endure shade; but in various countries naturally unwooded, meet with no obstacle to their diffusion; one method of detecting them having at the same time disappeared. In the absence of cultivation at the mouth of the Rio Negro, I was surprised at the number of foreign plants naturalized: some of which, in considering the course of intercommunication, appeared to have been brought by sea direct from the United States.

Gen. Legum. (No. 1). Hard rigid stems and branches; leaves pinnate, rare; flowers papilionaceous, yellow; pod like that of Mimoseæ.

(Adesmia, No. 1); gen. Hedysar. Habit of Genista; hoary, and spiny, with small pinnate leaves; the flowers yellow; and the pod jointed.

(——— No. 2). Herbaceous; the flowers yellow; the pod jointed. Growing on the tract of sand-hillocks.

Lathyrus? (No. 9); but the style smooth. The whole plant sericeous; and the flowers light-blue.

Vicia? (No. 4). Annual; a small species. Growing on the river-bank, within reach of the infiltration.

Mimosa (No. 13). The flowers pale, with a "tinge of pink;" a long strap-shaped pod.

Gen. Mimos. (No. 1). Pinn. multijugis. "On the campos," Brackenridge.

(Vachellia? No. 1); gen. Mimos. A low shrub, with white thorns; the flowers in globular heads, yellow.

Margyrocarpus (No. 1). Frequent; growing on the tract of sand-hillocks, and in other upland situations.

Lythrum (No. 4); the flowers very minute. Growing along the river-bank, within reach of the infiltration.

Gen. incert. (No. 1); Myrtus-like, but the venation differs. A low shrub; the leaves opposite, linear, hirsute.

Oenothera (No. 13). The flowers large, yellow, turning reddish in withering. Growing on the tract of sand-hillocks, and rather conspicuous.

Portulaca (No. 11). One of the most showy plants we met with, having large (reddish-) purple flowers. Growing on the tract of sand-hillocks.

Anychia? (No. 3). The flowers axillary.

———? (No. 4); smaller and more upright. Found by Mr. Brackenridge.

Tillæa (No. 6). On the muddy shores of the river. The specimens lost before they could be re-examined.

Brassica oleracea, (bis Peru, Polynesian Groups, New Zealand, Auckland Island, Australia, and the United States). Cabbages were brought on board the Vincennes, but the leaves proved coriaceous and hardly edible. The nearest cultivated spot, said to be "twelve miles up the river."

——— (rapa; bis Polynesian Groups, New Zealand, and the United States); the turnip. The flowers yellow. Growing spontaneously along the sea-coast; doubtless introduced.

Erodium. The flowers small. On the tract of sand-hillocks.

Melilotus (compare California). Annual; having the pod very small, one-seeded. (According to Gray, in his Volume on the plants of the Expedition, shown by the specimen to be "M. parviflora introduced from Europe.")

Medicago. Annual; having small leaves, and a crinited pod. Abundantly naturalized on the "campos," judging from the withered vestiges, and the patches of soil covered with a layer of pods. (Perhaps artificially disseminated?)

(———). Melilotus-like; the flowers purple; a smooth, hamate pod. On the tract of sand-hillocks. (According to Gray, in his printed Volume, shown by the specimen to be "M. sativa introduced.")

Mamillaria? (No. 1). Buried, so as to leave its broad green summit even with the surface of the ground. Growing on the marginal slope of the Upland plain.

"Cereus" (No. 6). Melocactiform; but sometimes agglomerated. Growing on the tract of sand-hillocks.

Opuntia (No. 6). Normal; though by no means conspicuous. Growing along the margin of the Upland plain.

"———" (No. 7). Remarkable for its stem-joints being ovoid or egg-shaped, not in the least compressed.

"———" (No. 8). Another remarkable though inconspicuous species; its stem-joints slender, and cylindrical. Growing along the margin of the Upland plain.

Hydrocotyle (No. 17). Growing along the river-bank, within reach of the infiltration.

——— (No. 18); larger. Growing along the river-bank, within reach of the infiltration. The specimens lost.

Mulinum (No. 1). Herbaceous, but rigid, with leaves like trifid spines; the fruit compressed. Growing in bunch-like tufts on the Upland plain.

Eryngium (No. 5). Upright, with the stem nearly naked; capit. cylindrical. On the river-bank, within reach of the infiltration.

——— (No. 6). Annual; prostrate; the fruit hispid and warty. On the river-bank, within reach of the infiltration.

(Apium graveolens?; compare Chili, and No. 1 New Zealand and Australia); the fruit with ten ribs. On the river-bank, within reach of the infiltration.

Galium (No. 19). Rigid, three to four inches high. On the tract of sand-hillocks.

(Boopis Anthemoides, No. 1); gen. Calycer. Leaves pinnatisect; involucre monophyllous; receptacle with long attenuate chaffs.

Gen. Calycer.? (No. 1); calyx monophyllous. Maritime; growing on the sea-shore.

(Picrosia? No. 1). Sonchus-like; with smooth entire leaves. The flowers yellow.

Gen. Sonchus-like (No. 1); the flowers white.

(Cyclolepis genistoides? No. 1); gen. Compos. Habit of Genista; but with larger and coarser branches. On the Upland plain.

(Trichocline? No. 1); gen. Compos. Habit of Gorteria; stemless; the leaves sinuate. On the Upland plain.

(Chuquiraga erinacea? No. 1). A shrub, having short linear pungent leaves; the flowers yellow, Helichrysum-like, with scarious unfading calyx-scales. Frequent on the Upland plain, and elsewhere.

(Hyalis argentea, No. 1). Highly ornamental; the whole plant covered with silvery pubescence; the leaves oblique; the flowers varying from rose-colored to white; the involucre containing five florets. Frequent on the Upland plain, and elsewhere.

Malus sylvestris, (bis Yemen, New Zealand, Australia, Brazil, and the United States). A single apple floating down the river; being the only sign of cultivation met with.

Amygdalus Persica, (bis Brazil, Hawaiian Islands, Zanzibar, New Zealand, Australia, and the United States). Peaches, said to be produced "near the town; about twenty miles" from the mouth of the river.

Daucus (compare Chili, Hawaiian mountain-region, New Zealand, Australia, and the United States). Annual. On the tract of sand-hillocks, growing spontaneously, but doubtless introduced.

Gen. Compos. (No. 1). Small; with linear leaves; and a single terminal flower.

(Lucilia? No. 1). Gnaphalioid; and at the same time, Helichrysum-like. On the Upland plain, and elsewhere. The same species formerly collected by Baldwin at the mouth of the La Plata.

(Chabræa? No. 1); gen. Compos. The leaves finely pectinate.

Gen. incert. (No. 1); perhaps not belonging to the Compositæ. Herbaceous, yet having the habit of Epacris and Styphelia; not seen in flower. On the tract of sand-hillocks.

Gen. incert. (No. 1); perhaps not belonging to the Compositæ. A shrub; the leaves small, triangular, broadest at the apex, and three-pointed; not seen in flower.

Vernonia-like (No. 1). In the marshes and infiltrated ground along the river-bank. The same species formerly collected by Baldwin at the mouth of the La Plata.

Stevia? (No. 2). The leaves linear, entire.

(Chiliotrichum? No. 1). Having the habit of the Magellanic Amellus diffusus. Growing on the Upland plain.

Gen. Amellus-like (No. 1). Leaves linear, entire, curved. On the Upland plain.

(Podocoma? No. 1). Erigeron-like; with large flowers, but the floret-rays yellow.

(Cænotus? No. 9). Somewhat resembling C. Canadensis.

Chætopappa-like (No. 1). Small; and having small white flowers. Growing on the river-bank, within reach of the infiltration.

Grindelia (No. 6); the flowers small. On the tract of sand-hillocks.

——— (No. 7). A large coarse plant; glutinous. On the tract of sand-hillocks.

Solidago (No. 23). In the drifting sands of the sea-shore.

Bigelowia? (No. 12); compare Chrysocoma. Having dense upright branches, with linear leaves and terminal flowers.

———? (No. 13); compare Chrysocoma. Rigid, and almost aphyllous. "Used for brooms."

Gen. Bigelowia-like (No. 1). Small; having the habit of the preceding plant.

Gen. Brachyris-like (No. 1); but the flowers cream-colored.

Baccharis (No. 10); trialate. On the Upland plain.

——— (No. 11); normal; but only three inches high.

——— (No. 12); perhaps not distinct from No. 11; larger.

Gen. Compos. (No. 1). Procumbent, coarse; large flowers, with small floret-rays; the receptacle with short paleæ.

Gen. Compos. (No. 1); the receptacle paleaceous.

Gen. Compos. (No. 1); the leaves margined with white prickles. On the tract of sand-hillocks, and elsewhere.

Unxia? (No. 1); habit of Eclipta. On the river-bank, within reach of the infiltration.

Sonchus (oleraceus?; compare Western Oregon, our Atlantic States, Peru, New Zealand, Auckland Island, and No. 2 Malta). Leaves runcinate; the calyx fleshy at base. Growing spontaneously, but doubtless introduced.

Centaurea?. Annual. Naturalized; growing spontaneously on the tract of sand-hillocks and throughout the Upland plain.

Cynara cardunculus. Not exceeding three feet in height. Naturalized on the tract of sand-hillocks.

Anthemis cotula, (compare United States). Naturalized.

Gnaphalium (No. 38). On the tract of sand-hillocks.

——— (No. 39); the calyx or involucre contracted above (connivent). On the tract of sand-hillocks.

——— (No. 40); the flowers in capit., aggregated.

Senecio? (No. 18); abnormal. Hoary, the leaves simple.

——— (No. 19). Green; the leaves succulent.

(Leptocarpha rivularis? No. 1; compare also Flourensia corymbosa); resembling California plant of Nutt. Gaillardia-like; the receptacle paleaceous; akenium bicaudate, or having two membranous awns. On the tract of sand-hillocks.

Gen. Coreopsis-like (No. 1); the inner involucre monophyllous; no floret rays.

——— (No. 2); a second species?. Glaucous; the inner involucre monophyllous.

Ambrosia (No. 7). On the tract of sand-hillocks.

Samolus (compare Brazil, and No. 1 United States). On the river-bank, within reach of the infiltration.

Asclepias (No. 14). Normal, and large-leaved; as though unaffected by the drought. Growing on the Upland plain.

Gilia? (No. 1). Annual, small. Cantua-like; the leaves dissected; the calyx awned.

Cressa (compare Peru, No. 1 Hawaiian Islands, and No. 3 California). The flowers pale-pink; styles two.

Heliotropium Curassavicum? (compare Hawaiian Islands, and No. 8 Interior Oregon, North California, and the sea-coast of Maryland). Growing in the drifting sands of the sea-shore.

Solanum (No. 53; perhaps a congener of our Arkansas Nycterium); the stamens unequal; the style declinate, incurved.

Lycium? (No. 5); compare also Solanum lycioides. A spiny shrub; the stems and branches white; the leaves small.

———? (No. 6); perhaps a second species; pubescent and coarser.

Limosella tenuifolia? (compare No. 1 United States). On the muddy shores of the river. Most of the specimens lost.

Capraria-like (No. 1). Annual. Having the habit of the above-mentioned Gilia; but the capsule two-celled.

Gerardia (No. 8). Habit of Gratiola. Growing along the river-bank, within reach of the infiltration.

Gen. Labiat. (No. 1). The odor Thymus-like. An unsightly shrub; the leaves being reduced to mere green granules, oppositely-disposed along the coarse blackish branches. On the Upland plain, and elsewhere.

Verbena "pulchella?" (No. 11). The leaves dissected; the flowers small.

Zapania (compare No. 1 North California). Small.

Xanthium strumarium? (compare Hawaiian Islands, our Atlantic States, and No. 1 Egypt). Growing spontaneously, but probably introduced.

——— spinosum, (No. 3). Only one stock met with; and this was growing in a situation that indicated the bringing of the original seed in some vessel; possibly, all the way from our Middle States.

Polygonum aviculare? (compare No. 10 Western Oregon, Interior Oregon, and our Atlantic States). Growing spontaneously, but probably introduced.

Statice Limonium? (compare No. 1 Aden, and No. 2 California and our Atlantic coast). Maritime; growing in the salt-marshes.

——— (No. 3); the flower-branches more upright; the leaves narrower. Maritime; growing in the salt-marshes.

Plantago maritima? (compare No. 15 Western Oregon, and our Atlantic Coast). Maritime; growing in the salt-marshes.

——— (No. 23). Annual; the leaves linear; the spikes woolly. Growing on the tract of sand-hillocks.

——— (No. 24). Annual; the leaves linear. On the tract of sand-hillocks.

——— (No. 25); the leaves lanceolate-linear; the spikes woolly.

——— (No. 26); the leaves lanceolate.

——— (No. 27); a large species, having lanceolate leaves. In the marshes, more or less brackish, along the river.

Salicornia (No. 10). Root perennial; stem upright, and of woody consistence. Maritime; growing in the salt-marshes.

Atriplex (No. 8). Procumbent; hoary; small-leaved.

——— (No. 9). Upright; hoary; the margin of the enlarging calyx-leaves entire.

Gen. Atriplex-like (No. 1). Branching; a leafy involucre; seed single. On the perpendicular cliff, three miles South of the river-mouth.

Gen. Chenopod. (No. 4). A shrub, having linear succulent leaves, and axillary flowers; calyx chaffy, five-leaved; fruit superior; four or five styles, and a single black seed.

Chenopodium (No. 9). Procumbent; the leaves dissected, and small.

Suæda (No. 5). Resembling S. prostrata; and in like manner prostrate; calyx five-leaved. Maritime; growing in the salt-marshes.

Amaranthus (No. 6); apparently a peculiar species.

Rumex (No. 18). Along the border of the marshes, within reach of the infiltration.

Euphorbia (No. 44). Resembling E. maculata (of our Atlantic States); prostrate.

——— (No. 45). Normal; upright. On the tract of sand-hillocks.

Salix (No. 26). Resembling Arkansas sp.; the leaves linear, serrate. A detached branch, floating in the river.

Ephedra (No. 1). On the tract of sand-hillocks.

Gen. Arethusa-like (No. 1. Withered vestiges of) an ornamental species. On the tract of sand-hillocks, rare.

Sisyrinchium (No. 10). On the river-bank, within reach of the infiltration.

"Habranthus" (No. 1). Amaryllis-like, and ornamental; three-flowered; the flowers large, white, slightly tinged with pink. On the tract of sand-hillocks, somewhat rare.

"———" (No. 2). Smaller; bearing a solitary red and yellow flower. On the Upland plain.

Ornithogalum? (No. 6); or compare Allium. The flowers white. Growing on the river-bank, within reach of the infiltration.

Polypogon (Monspeliense?; compare No. 1 Europe); normal. Growing on the Upland plain.

Avena sativa? (compare No. 2 Europe, Egypt, California, and our Atlantic States); the oat; but the flowers seeming small. Growing on the tract of sand-hillocks; and also on the Upland plain.

Triglochin (No. 4). Maritime; growing in the salt-marshes.

Juncus (No. 35); resembling J. maritimus. Growing in the salt-marshes.

——— (No. 36); resembling J. acuminatus; articulated. On the river-bank, within reach of the infiltration.

Carex (No. 77). In the marshes, often where brackish.

——— (No. 78); perhaps a second species.

Isolepis? (No. 6; compare No. 5 Australia); resembling I. Savii. Small, with a single lateral spike. On the muddy shores of the river.

Scirpus lacustris? (compare No. 1 Hawaiian Islands, Western Oregon, and California). In the marshes, often where brackish.

——— triqueter? (compare No. 13 Western Oregon, North California, and our Atlantic Coast). Growing in the salt-marshes, and perhaps strictly maritime.

Panicum? (No. 39); the florets woolly. Maritime; growing in the drifting sands of the sea-shore. The same species formerly collected by Baldwin at the mouth of the La Plata.

Setaria (No. 5). On the Upland plain. (Perhaps not indigenous).

Aristida (No. 18); long-awned. On the Upland plain, and elsewhere.

Gen. near Aristida (No. 1). Much like a small slender Cenchrus; membran. Growing on the Upland plain.

Agrostis? (No. 27). Withered vestiges, having only the calyx-glumes remaining. On the Upland plain.

Nov. Gen. (No. 3); the American genus of grasses, wrongly referred to Polypogon, and resembling awned species of Agrostis. Growing on the Upland plain.

Phragmites (compare No. 1 Italy, Oregon, California, and our Atlantic States). In the marshes, often where brackish. No specimens.

(Deyeuxia? No. 1). Donax-like; conspicuous at a long distance from its tall silvery-white plume-like panicle; the spikelets two-flowered. On the drier portion of the marshes, towards the margin.

Psamma? (No. 2). A grass much resembling P. arenaria. Maritime; growing in the drifting sands of the sea-shore.

Gen. Psamma-like (No. 1). Habit of Anthoxanthum. On the Upland plain.

Spartina glabra? (compare No. 2 North California, and our Atlantic Coast). Maritime; growing in the salt-marshes.

(——— No. 5); normal. Maritime; growing in the salt-marshes.

Melica-like (No. 1); the margin of the florets ciliate. Maritime; growing in the drifting sands of the sea-shore.

Ceratochloa (No. 1). On the margin of the Upland plain.

Uniola spicata? (compare No. 1 Oregon, California, and our Atlantic Coast). Maritime; growing in the salt-marshes.

——— (No. 2); perhaps a second species; the florets two together in a spikelet, or even in some instances single.

(Eragrostis); Megastachya (of Palis.). Perhaps introduced.

Lolium. Growing on the tract of sand-hillocks; probably introduced.

Triticum vulgare, (bis New Zealand, Australia, Oregon, and our Atlantic States); wheat. Said to be "cultivated near the town; about twenty miles" from the mouth of the river.

Agropyrum (repens?; compare No. 7 Our Atlantic States). Growing on the Upland plain; (possibly indigenous).

Elymus (No. 15). Growing on the tract of sand-hillocks, and elsewhere.

Apogonia (No. 1); Rottboella of authors. Resembling A. ciliata of Nutt. On the Upland plain, and elsewhere.

Andropogon (No. 31); normal. Growing on the Upland plain.

Azolla (bis No. 2 California and Brazil). Floating in the river; drifting and collecting along the water's edge.

Parmelia? (No. 13); a fine species. Adhering to the stem and branches of a shrub; rare, once only met with.

Tropical American Analogies. At so great a distance from the Tropics, under such an entire change in climate and the vegetable growth, the continuance of Tropical forms and genera was unexpected. They were, however, few and rare, and nowhere prominent; consisting of the *Mimosa*, two *Amaryllidaceæ*, and the *Cereus*.

North American Analogies. A general resemblance to the unwooded portion of Arkansas was remarked by Mr. Peale; and notwithstanding the wide geographical interval, some characteristic genera were observed to be in common: as, *Grindelia*, *Stevia?*, *Baccharis*, *Oenothera*, *Opuntia*, *Gilia?*, the *Solanum* with deflected unequal stamens, *Apogonia*, and *Agropyrum*. Other North American genera were met with: as *Sisyrinchium*, *Anychia*, *Gerardia*, *Bigelowia?* or a genus agreeing in habit, *Asclepias*, *Uniola*, *Ceratochloa*, and *Spartina*.

European Analogies. After excluding the genera that are common to all cool climates, European Analogies are traceable only in the presence of the *Zygophyllaceæ*, *Ephedra*, the normal upright *Euphorbia*, and in the Ulex-like Genistoid aspect of certain Compositæ.

Analogies with distant Austral countries. The Austral genera of plants are known to be confined in a very striking manner, each to its own division of the globe: but I was unprepared to find so little in common with Austral Africa on the opposite side of the Atlantic; amounting to the mere simulating of Helichrysums by certain Labiatifloral Compositæ.

2. Terra del Fuego.

Continuing South, the Vincennes on the 14th of February, arrived at the Straits of Le Maire. In sailing through, we left Staten Island in the distance, keeping near the main land of Terra del Fuego. The coast appeared everywhere rocky and rugged, at the base of

broad conical mountains of moderate elevation. On their sides were two or three small patches of snow; while each mountain-summit for some distance downwards in irregular streaks, was dull-white, as though covered with Lichens. This appearance is attributed by King to bare surfaces of "granite:" and the *granitic* character of the country was soon demonstrated, by one mountain-summit being conspicuously capped with a remnant of trap or basaltic rock. Lower down, the mountains were freshly verdant to their base; clothed, as well as could be made out with the glass, with a luxuriant forest; its slight filmy or cobwebby aspect, being probably due to the whitish trunks and branches of the "evergreen birch." Near at hand, GOOD-SUCCESS BAY, situated in "S. lat. 54° 48′," had been visited three weeks previously by the Relief; when on landing, Mr. Rich found the vegetable growth "much more luxuriant than at Orange Harbor," farther South.

On the 15th, we were at a greater distance from the land. The weather cloudy with the sun out at intervals, as for some days past; but the temperature had become more chilly; though on the whole, the weather was regarded as "fine" for the Vicinity of Cape Horn.

On the 16th, a pleasant summer day, with the temperature at 58° Fahr., the Vincennes doubled Cape Horn; a pyramidal islet, "five hundred feet high." Similar outlying islets are frequent along and around the coast: which is iron-bound and steep, with the cliffs more or less precipitous, and some of the detached rocks needle-shaped. The coast-line is at the same time excessively indented; narrow channels leading between islands, or in other instances expanding into inland bays.

There was no longer any whitish tinge on the mountain-summits, but patches of snow were more frequent, with a general less inviting aspect: in other respects, the character of the country continued unchanged; as also further West; the succession of broad-conical mountain-peaks rising out of the sea to a very uniform elevation all the way to Cape Glocester, and nowhere exceeding "twenty-six hundred" feet in height. The view of Christmas Sound in Cook's Voyages, gives a good idea of the outline of the whole South side of Terra del Fuego. The forbidding blackened aspect of the mountain-flanks, due to a kind of a black-colored wettish moss, if not the origin of the name "terra del fuego" or "land of fire;" has at least been mistaken for burnt districts by navigators.

Just beyond Cape Horn, the Vincennes changed her course, and

turned Northward; beating against the wind up Nassau Bay; the weather on the 17th continuing fine, the sky not altogether free from clouds, but the sun out most of the time, and the temperature varying only from 56° to 58° Fahr.

On the 18th, the Vincennes anchored in ORANGE HARBOR; situated in "S. Lat. 55° 30′," among gently-sloping heights, less steep and less elevated than elsewhere along the coast. The component rock, to the limit of our excursions, proved in general dark-colored; consisting of trachyte or *trap*, presenting small irregular cavities, more or less numerous, with occasionally *conglomerate* alternating and intermixed: but Mr. Dana showed me specimens of fine-grained conglomerate passing into sandstone and containing fossils, and of normal amygdaloidal trap.

CLIMATE. We had arrived in the closing summer-month of the Southern Hemisphere; but during my five weeks' stay, (most of the time at sea in the Relief), the 16th of February already-noticed, was the only entirely clear day. From this date, the weather continued fine until the evening of the 20th, but during a portion of each day the sun was obscured by clouds: on the 21st, there was a slight fall of snow: and on the succeeding days, more or less of chilly rain with high winds and thick weather, amply confirming the correctness of King's account of the climate. The temperature during the whole five weeks, varied only from 58° Fahr. to 36° Fahr.

At this termination of a long narrow body of land, the climate is altogether insular; and in the absence of any marked distinction of seasons, may be regarded either as perpetual summer, or perpetual winter: being summer according to the vegetation, growing sluggishly throughout the year, and always freshly-green; and winter according to the boisterous winds, constant chilliness, and frequent hail and snow. But I met with no glaciers, nor with evidence that ice forms, even on the mountain-tops; where the accumulations of snow were always slowly melting. The absence of clothing, none being worn by the aboriginal people, is further proof, that severe cold is unknown.

THE STRAND, OR SHORE ALLUVIAL. From our anchorage, on looking with a glass around Orange Harbor, a border of rank-growing herbaceous plants of surprising luxuriance was perceived at the water's edge; overtopped here and there by the white flowers of *Cineraria? gigantea* in a conspicuous corymb, and more rarely by the beautiful shrub, *Hebe decussata*. On landing, this luxuriant vegetable growth

was found to occupy a nearly continuous strip of level alluvial soil; and to consist in great part of upright crowded stems of *Apium* or wild celery, more than two feet high; the remaining spaces being filled with tall grasses, crowded together, as *Alopecurus Antarcticus?*, a *Phleum*, *Festuca*, *Agropyrum*, and a tall *Aira;* with occasionally herbaceous plants intermingled, as a *Misandra* with long-petioled reniform leaves, a large abnormal *Chrysosplenium*, *Galium aparine?*, a large *Ancistrum* with troublesome burs, a tall linear-leaved *Cerastium*, and more rarely a large-flowered *Cardamine*.

From the first, the absence of saline and of all genuine maritime plants seemed surprising; but may in part be accounted for by the predominance of wet weather, the excess of dripping moisture. An *Armeria* indeed was sometimes present, but the species is probably not exclusively maritime.

The Upland, chiefly unwooded and subalpine. After crossing the level alluvial strand, the vegetable growth on the commencement of the upland proved yet more crowded, denser than I have witnessed elsewhere: consisting of *Juncus?* *grandiflorus*, various grasses, *Pernettya acuminata* or bush-cranberry, with other plants, all a foot or so high, and requiring to be parted with the hands to procure the diminutive subalpine plants beneath. Among them, *Nanodea muscosa* presented itself as a mere terminal solitary berry on the surface of the soil: and contrary to our experience amid vegetable growth in Brazil and even Patagonia, we soon found ourselves botanizing on the knees.

Throughout the most of the Upland, the subalpine plants were comparatively free from the overshadowing of grasses and undershrubs: and it was soon perceived, that local distinctions between wet and dry soil had disappeared; the densely matted and congested plants, with their interlaced roots more or less fibrous, forming a spongy turf that retained and equalized the moisture. The same wet spongy turf, composed of the same species of plants, covered hill and dale, extending to the very cliffs of the coast, and even within the occasional reach of surf. Here, however, were a few species of plants intermingled, that were not met with inland: as, a one-flowered *Plantago* having dentate leaves; *Bulliarda? moschata;* a *Bolax* inclining to become diffuse; *gen. Tanacetoid* having a solitary flower; *gen. Saginoid;* and an *Ourisia*, the only one of these six plants that presented nothing of the congested alpine habit of growth.

In proceeding towards the Interior, the face of the country proved in great part a succession of bogs, dammed up by contractions between rising ground, and containing pools much resembling those artificially formed by removing peat. Some of the most watery of these bogs contained traces of *Sphagnum*, in a few scattered handfuls; while everywhere around, the *Melanthium? pumilum* in a matted carpet extended for acres both over the bog and adjoining portion of the upland. The general surface of the country presented a coating of congested alpine plants, distinguished into small patches; in some species flat-topped, in others swelling in slightly-projecting bunches, but the crowded and impacted leaves forming an even surface: these congested social species consisted principally of *Oreobolus; Gaimardia Australis; Witsena Magellanica*, like a congeries of combs sunken with the points upwards; two or more species of one-flowered *Plantago;* four or five congested *Compositæ*, the minute flower hardly distinguishable in the crown of leaves; *Donatia fascicularis;* several sessile-flowered Umbelliferæ belonging to *Bolax* and *Azorella;* two or three species of *gen. Saginoid; Forstera muscifolia;* a *congener* of Caltha? appendiculata; and even a *Viola* growing in large congested alpine bunches, and remarkable besides for its abnormal bilobed leaves. Throughout the whole extent of this congested growth, certain diminutive plants were intermingled singly, and were therefore less conspicuous: as, *Nanodea* already-mentioned; a second *Misandra; Pernettya empetrifolia* and another diminutive *Ericaceous* plant; *Pratia repens; Myrtus nummularia; Rubus geoides;* and other plants: while growing at intervals, some genuine *Mosses* and *Lichens*.

On more closely examining the spongy turf, the included vegetable substances were found to decay with extreme slowness; leaves dead for a very long series of years, still adhering underground to the stems of the alpine plants. Of these alpine plants, presenting a mere area of hard even surface, some proved to be real underground shrubs; their crowded branchlets uniting downwards in a stout woody stem. On the other hand, the one-flowered *Plantagos* were observed to have their seeming branchlets fleshy, and each congested alpine bunch proved to be a many-crowned root.

This impacted vegetable growth was mistaken for mosses by the sailors: and a good idea of its humidity may be gathered from the remark of one of my companions, that he "had never before seen rushes growing upon high ground:" the "rush" in question, *Juncus? grandi-*

florus, was frequent all over the upland; not in crowded clusters like our Northern species, but diverging in long straight soldier-like files of upright pointed stems, as though marching to take military possession. Besides this rush, scattered grasses rose here and there out of the spongy turf; with an occasional herbaceous plant, several inches high and rather showy, as a white-flowered *Cinerarioid* and some other *Compositæ:* scattered shrubs, one or two feet high, being usually in sight, as the Cratægus-like *Escallonia serrata*, *Chiliotrichum amelloides*, *Pernettya acuminata*, *Empetrum rubrum*, and stocks of the "beech" and "evergreen birch" dwarfed and reduced to the stature of shrubs.

Higher up, as we ascended the mountain-slopes, the bushes and dwarfed trees were observed to diminish very regularly in height, and at length grew only in abrupt depressions, and in the lee of projecting ledges of rock; where their interlaced summits were all kept at the level of protection by the overpowering winds, as though sheared off by art. The dwarfed "beech" abounding in these situations, imparted to them a dark-green hue in the distance: while in the open country, in certain exposed situations, the wet turf presented the illusive appearance of having been burned, from the abundance of the *black-colored* moss, already-mentioned.

On the mountain-crest and summits, twelve to fifteen hundred feet in elevation, we met with a few banks of accumulated snow; and obtained a view beyond and inland, of higher mountain-peaks, having more of their surface streaked and covered with snow; one situated Northwest by compass, and perhaps the Mount Darwin of King, being entirely white, with the exception of a few projecting rocks. At our feet, the vegetable growth presented an even carpet-like surface; where, if there remained an occasional stock of "beech," *Fagus Antarctica*, it was reduced to the form of a short prostrate vine. The sod had become more densely impacted, and species of plants not seen below made their appearance: as, a one-flowered *Plantago*, with short resisting leaves, parting the surface into stellated areas, like beds of beautiful green Actiniæ; two or more species of congested alpine *Umbelliferæ:* and growing in clefts of the projecting jagged rocks, where the sod was hardened, dry and grey, three species of *Saxifraga:* in sheltering clefts, and the fragmentary stony ground around patches of melting snow, many plants not having the alpine habit, a second *Aira*, a *Luzula* resembling L. spicata, gen. *Anthericum-like*, an *Armeria* nearly stemless, two or three *Senecios* and perhaps

other Compositæ, a *Geum*, the small cespitose *Nassauvia*, a sericeous *Ancistrum*, a hairy *Cerastium*, and a diminutive white-flowered *Ourisia:* while here and there, boldly projecting nearly a foot above the carpet-like surface of the sod, the beds of large *Nassauvia* seemed to derive protection from the enveloping of the blanket-like leaves: the terminal rocks being coated with *incrusting Lichens*, and the tufts of *Usnea melaxantha?*. The gen. *Culcitium-like*, found by Mr. Brackenridge, will complete the List of all the plants we met with that seemed peculiar to mountain-summits.

There was, however, on pointed rocky summits of inferior elevation, a tendency to the re-appearance of this vegetable growth; one of the *Saxifragas* occurring on an exposed summit only five hundred feet above the sea.

Here, and lower down, *Embothrium coccineum*, a low straggling shrub, a counterpart to our Northern Rhododendrums, made its appearance, growing only on the tops of stony hills, where, from the preponderance of rocky fragments, the soil was a little less moist than usual.

The Forest. Trees grew only in the vicinity of the coast; occupying in a real forest the steep acclivities, and the sides and bottom of ravines containing running water. In the distance, the forest presented a decided Brazilian outline, in the over-arching dome-like tree-tops: but on landing, the average height proved only about thirty feet, with the trunks of the trees rarely more than eight inches in diameter. The trees consisted almost exclusively of *Nov. gen.? betuloides;* resembling a birch in its conspicuously white trunk and branches, and in its leaves, except that they are evergreen; while throughout the forest, the hazel-leaved beech, *Fagus Antarctica*, proved comparatively rare, intermingled singly and at intervals. Above the elevation of about four hundred feet, the forest ceased, the trees becoming depressed and dwarfed to shrubs; as indeed wherever growing singly in the open country; the spongy turf producing on them the same unfavorable result as barren soil, being on the contrary too retentive of moisture. The Fuegian Magnolia, *Drymis Winteri*, attained larger dimensions than the other two forest-trees, but was quite rare, and occurred only singly: the loftiest met with, measuring fifty feet high with the trunk two feet in diameter, was growing on the South side of Burnt Island, and may prove the very last large tree in proceeding towards the Southern Pole.

In the distant forest, on the tops and outer branches of the "evergreen birch," a species of mistletoe, *Misodendron punctulatum*, formed conspicuous spots, by paler-green foliage and tassels of whitish threads.

The forest was in various places filled with an undergrowth, or almost intermixture of large shrubs, eight to twelve feet high, with the stem an inch often in diameter: consisting of the black-fruited *Ribes* or currant, *Berberis ilicifolia*, the entire-leaved *Berberis*, the polygamous *Cassinoid* with opposite leaves, and *Chiliotrichum amelloides;* the latter alone extending into the open country, where, like the stray forest-trees, it was uniformly depressed and dwarfed.

The foliage on trees and shrubs was observed to be evergreen and more or less coriaceous, with two marked exceptions: the *Ribes* and the entire-leaved *Berberis*, two shrubs having leaves of tender consistence, but whether at any period deciduous could not be ascertained.

The turf ceasing at the forest-line, with the changed condition of the soil where shaded, a variety of nemoral or woodland plants made their appearance: large Ferns, as a *Lomaria*, *Blechnum*, and *Gleichenia;* and more rarely, a few normal herbaceous woodland plants, as the ornamental *Calopogon? Lessonii*, an *Osmorhiza* resembling our O. brevistylis, a *Ranunculus* in moist places, an *Epilobium* along streams, and the *Callixine* more widely-scattered, but chiefly at home in the forest. The ground within the forest was principally occupied by a moist, humble, though luxuriant growth of *Mosses*, *Hymenophyllums*, and *Hepaticæ;* on stones projecting out of the water of torrents, giving place to the diminutive *Oxalis Magellanica;* and around the base of trees, interlaced in the semi-epidendric masses of a creeping Oxycoccoid *Epacrideous* plant. Scattered *Lichens*, it should be observed, were here and there intermingled among the green diminutive growth of mosses.

Character and composition of the vegetable growth. The forest occupied but a limited portion of the area of the country; but from their bulk, the forest-trees contributed very largely to the total mass of growing vegetable substance; numbering at the same time but three species, two of them *Amentaceæ*.

With such an incongruous element, it is difficult to draw just comparisons: but after excluding the forest-trees, and the small Cryptogamous plants, the vegetable growth appeared to consist mainly of four Families, *Compositæ*, *Graminaceæ*, *Umbelliferæ*, and *Ericaceæ:*

1. *Compositæ.* Dominant: the genera and species numerous; some of them minute-flowered and congested, entering largely into the composition of the alpine and subalpine turf.

2. *Graminaceæ,* or grasses. Frequent, everywhere except in the forest; the species numerous, most of them belonging to familiar Northern genera. An unusual tendency in them to become viviparous was remarked; the florets of at least two species being almost always replaced by bulbs.

3. *Umbelliferæ.* Including the sea-side *Apium,* and the woodland *Osmorhiza;* and characteristic, on account of the sessile-flowered species, entering largely into the composition of the alpine turf.

4. *Ericaceæ.* Frequent in certain portions of the open country; but growing in a scattered manner, and nowhere exceeding the dimensions of medium-sized shrubs.

Next after the above four prevailing Families of plants, five other Families were extremely abundant, occurring in the following order of frequency:

5. *Rosaceæ.* Holding the fifth place; principally on account of the frequent *Ancistrums* and *Acœna.*

6. *Cyperaceæ.* Consisting principally of *Carices* and *Caricæ;* but including some *Scirpeæ.*

7. *Filices,* or ferns. The larger species were confined altogether to the forest. On the other hand, a diminutive species of *Polypodium,* having its fronds entire and hardly half an inch high, was agglomerated in large alpine bunches; that extended far under the shade of the forest, and throughout the open country, to the very summits of the mountains.

8. *Juncaceæ.* Holding the eighth place; chiefly on account of the frequent occurrence of *Juncus? grandiflorus* throughout the open country.

9. *Caryophyllaceæ.* Holding the ninth place; chiefly on account of the congested alpine tufts or beds of *gen. Saginoid,* extending throughout the open country.

There yet remain species of plants, abundant or remarkable, that seem to require notice: as the frequent *Gentiana;* a normal *Viola:* and growing on declivities moister than usual from the continual trickling of water, the abnormal minute-flowered *Caltha? appendiculata, Drosera uniflora,* a *Pinguicula,* the Triglochin-like *Tetroncium,* and *Primula farinosa?:* while the exposed muddy border of mountain-

pools was in some rare instances enlivened by the large flowers of the Ficaria-like *Caltha ? sagittata.*

The following is a List of the plants found growing in Southern Terra del Fuego; at Good Success Bay in the Straits of Le Maire, and at Orange Harbor:

Ranunculus (No. 23). In moist places, in the shade of the forest.*

Ficarioid sagittata, (No. 1); Caltha of Cav. Carpels twenty or more. On the denuded muddy soil at the margin of mountain-pools; rare.

Nov. Gen. appendiculata, (No. 1); Caltha of Commers., but widely differing from that genus in its diminutive flowers and singular foliage.

——— (No. 2); a congener of No. 1. Densely cespitose in congested alpine bunches, and having small entire leaves. Frequent, but very rarely seen in flower.

(Drymis Winteri, No. 1); Wintera aromatica of authors. The largest forest tree; occurring singly, at wide intervals, and in full flower at the time of our visit. The one on the South side of Burnt Island, may prove the largest tree growing so far South; Cape Horn being in plain sight.

Berberis ilicifolia, (No. 2). A large shrub, eight to twelve feet high, with the stem an inch in diameter. Frequent in the forest, but the flowers and fruit rare.

——— "dulcis?" (No. 3); the leaves entire, and of more tender consistence. A shrub, of equal dimensions with No. 2, and in like manner growing in the forest.

Brassica? (Magellanica, Pers., No. 3); compare Sisymbrium and Nasturtium. The leaves dissected and much divided; flowers large, yellow. "Good-Success Bay," Rich.

Cardamine (glacialis, Dec.? No. 11); scurvy-grass. Allied to C. hirsuta; flowers large, white. Along the sea-coast; not abundant.

Viola (No. 28). Densely-cespitose in congested alpine bunches; the leaves bilobed. Confined chiefly to the mountains.

——— maculata? (No. 29); normal. Rather frequent.

———, perhaps a third species.

Drosera uniflora, (No. 11). Growing on moist declivities.

(Colobanthus) crassifolius, (No. 1); Sagina of D'Urv. The capsule four-valved.

(———) subulatus, (No. 2); Sagina of D'Urv. Closely and diminutively cespitose, the leaves being very short and rigid. On mountain-summits.

(———), perhaps other species.

Stellaria debilis, D'Urv.? (No. 12); diffuse. "Good-Success Bay," Rich.

Cerastium (No. 9). A foot high; the leaves linear. Growing along the sea-coast.

——— (No. 10); leaves linear, hairy. Seen only on mountain-summits.

Oxalis Magellanica, (No. 21). Abnormal; diminutive; trifoliolate. Growing on moist rocks projecting out of rills in the shade of the forest; somewhat rare.

Gen. incert. (No. 1). Having something of the aspect of Samolus; leaves fasciculate, glaucous, linear, obtuse; petals five; stamens five; capsule superior, three-celled, many-seeded.

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*Urtica (No. 22). Resembling U. urens. Only one stock met with; and this was growing in the centre of a deserted Fuegian hut, the seed having doubtless been unintentionally brought there by the natives. The only foreign or displaced plant met with.

Cassine-like (No. 1). A large shrub, eight to twelve feet high, with the stem often an inch in diameter; leaves opposite; flowers polygamous; stamens, five; the capsule three-celled. In the forest; rare.

Acæna pinnatifida, Ruiz & Pavon? (No. 3); the flowers in a cylindrical spike. Growing on the subalpine upland.

Ancistrum (No. 3). Large; the burs very troublesome. Growing along the sea-coast; and also in the forest.

——— (No. 4). Hairy, and not so tall. Growing on the mountains.

——— (No. 5); sericeous, with small capit. On mountain-summits; rare.

Rubus geoides, (No. 29). Frequent on the subalpine upland.

Geum parviflorum, Comm.? (No. 7); normal. Growing around the patches of melting snow on the mountain-summits; rare.

Myrtus nummularia, (No. 23). A very humble plant. Rather frequent.

Epilobium (No. 19). Much resembling E. coloratum; herbaceous. On the banks of streams, in the forest; somewhat rare.

Bulliarda? moschata, (No. 1). Sepals four; petals four; stamens four; four club-shaped nectaries; and four carpels. Growing on the rocks of the sea-coast; but not seen by us "immersed."

Ribes (No. 10). A tall shrub, eight to twelve feet high; the leaves hardly perennial, being tenderly herbaceous; the berries black. In the vicinity of the sea-coast, and chiefly growing in the forest.

Escallonia serrata, Smith; (No. 1). A Cratægus-like shrub. Frequent.

Donatia fascicularis, (No. 1). On the subalpine upland. Frequent.

Saxifraga (No. 8). Pubescent or hairy; the leaves divided; a single terminal flower. Growing on mountain-summits.

——— (No. 9). Smooth; leaves divided, and the apex of each segment ciliate. On mountain-summits; rare.

——— (No. 10). Diffuse, and tenderly herbaceous; leaves entire, spatulate. On mountain-summits; rare.

Chrysosplenium? (No. 3); compare Hydrocotyle glechomoides of Dec. Tenderly herbaceous, a foot high. Growing along the sea-coast.

Azorella chamitis, (No. 1). Perhaps the smallest of all Umbelliferous plants. Growing on mountain-summits.

——— lycopodioides, Gaud.; (No. 2); compare Pectophytum. Leaves smooth, trifid; the inflorescence with two serrate involucral leaves. On the mountains.

———? ranunculus, D'Urv.; (No. 3); Hydrocotyloid. Among alpine plants.

Fragrosa? (No. 1); compare F. multifida of Ruiz & Pavon. Leaves reniform, dentate, hairy on the upper-surface. On mountain summits.

Bolax glebaria? (No. 1). Leaves entire, or sometimes trifid, glaucous above, green beneath. Frequent.

——— (No. 2); perhaps a second species. The leaves glaucous on both surfaces, and all trifid. On hill-tops of medium elevation.

——— (No. 3). Somewhat diffuse; the leaves entire, revolute. Growing on the rocks of the sea-coast.

Apium (dulce?, No. 2; compare No. 1 New Zealand, Australia, North Patagonia, and Chili, but much taller and more luxuriant). Along the sea-coast, in great profusion: its wild, unbleached stems hardly edible, on account of their strong flavor; which, however, decidedly resembles that of the garden celery.

Osmorhiza (No. 5); distinct from O. Berterii, and resembling our O. brevistylis: but devoid of an involucre. Growing in the shade of the forest.

Misandra (No. 1); leaves reniform, long-petioled. Frequent along the sea-coast.

——— (No. 2). Low; hairy. Growing on the mountains.

——— (No. 3). Small; the leaves smooth, lobed. On the mountains.

Misodendrum punctulatum, Banks; (No. 1); the Fuegian mistletoe. Leaves entirely resembling those of Viscum. Parasitic on the exposed outer branches of the "evergreen birch;" frequent.

——— brachystachyum, Dec.; (No. 2); smaller; aphyllous. Parasitic on trees; rare.

Nertera (No. 4; compare No. 1 Hawaiian mountain-region). The flowers sessile. Rare.

Galium aparine? (compare No. 5 Western Oregon, and our Atlantic States). Growing intermingled with the Apium along the sea-coast, and around deserted huts of the natives.

——— (No. 20). Much resembling our G. trifidum, but always small.

Leontodon? (No. 2). Smooth; the pappus stipitate. "Good-Success Bay," Rich.

———? (No. 3); the leaves runcinate. "Orange Bay, on the mountains," Rich.

(Achyrophorus arenarius? No. 1); Gen. Cichorac. Herbaceous, upright, a foot high; cauline leaves pinnatifid; flowers greenish.

Hieracium Antarcticum, D'Urv.? (No. 16). On the subalpine upland.

Nassauvia (No. 1); agreeing with Lamarck's figure. Normal; large. Growing only on mountain-summits.

——— (No. 2); small, cespitose. Growing only on mountain summits; rare.

(Clarionea Magellanica; No. 1). Gen. Aster-like, having also something of the habit of Chrysanthemum; the lower leaves being pinnatifid. Frequent on the subalpine upland.

Chiliotrichum amelloides, (No. 2). A shrub. Frequent, and very generally diffused; in the forest, eight to twelve feet high; and in the open country, only a foot or two.

Tripolium (No. 6). Somewhat stout; many-flowered. In wet depressions, on the subalpine upland.

——— (No. 7). Slender, few-flowered. Mountain moors, somewhat rare.

——— (No. 8). Growing along the sea-coast.

——— (No. 9). Growing on the mountains.

Lagenophora Commersonii, (No. 4). Rather frequent.

Gen. Aster-like (No. 1). The lower leaves incised. Growing on the subalpine upland.

Baccharis Magellanica? (No. 13). A depressed shrub, about a foot high; margin of the leaves with five or six dentures. Rare.

Gnaphalium affine, D'Urv.? (No. 40).

Gen. Compos. (No. 1). Leaves tridentate; involucre simple (the calyx-scales being in a single series). "Orange Bay," Rich.

Senecio? littoralis (No. 20); flowers large, yellow. "Good-Success Bay," Rich.

——— (No. 21); leaves tridentate, tomentose beneath; flowers yellow. Growing on mountain-summits.

——— (No. 22); leaves entire; flowers yellow. On mountain-summits.

——— (No. 23); leaves tridentate; flowers pedicelled. "Good-Success Bay," Rich.

——— (No. 24); leaves reniform, dentate. "Good-Success Bay," Rich.

Gen. Cinerarioid (gigantea; No. 1); Cineraria of authors. Herbaceous, and very large; the terminal corymb of white flowers being conspicuous at a long distance. Frequent along the sea-coast.

——— (No. 2). A foot high; leaves broad; the flowers white. Frequent everywhere on the subalpine upland.

Gen. Cacalioid candicans, (No. 1). Along the "sea-coast at Good-Success Bay," Rich.

———? (No. 2); leaves linear, sparsely dentate; the flowers yellow, and perhaps rayless?. "Orange Harbor," Rich.

Gen. (Culcitioid, No. 1). Compos.; leaves lanceolate, upright, lanate, entire. On "mountain-summits," Brackenridge.

Gen. Tanacetoid (No. 1); compare Achillea. Hardly an inch high; a single terminal flower. On the rocks of the sea-coast.

Oligosporus emarginatus, Gaud? (No. 1). Cespitose, smooth. Rare.

——— (No. 2). Cespitose, pubescent; calyx-leaves six to seven; the flower consisting of five to seven florets; pappus none. Frequent.

Gen. Compos. (No. 1). Very minute; flowers sessile. On mountain-summits.

Gen. Compos. (No. 1). Inconspicuous; and having a single purple flower.

Forstera (No. 1). Frequent on the subalpine upland, in tufts and patches, more moss-like than those of the other phænogamous plants.

Pratia repens, (No. 1). Frequent on the subalpine upland.

Pernettya empetrifolia, (No. 1); Lamarck 366, 3; see also Gaud. Pl. 67, but the calyx not fleshy. Humble; growing in tufts, on the mountains and elsewhere.

——— mucronata, (No. 2); Lamarck 366, 2. A shrub, sometimes three or four feet high; the berries large, purple, slightly bitter, but edible. Abundant.

———? (No. 3). A diminutive plant, having exceedingly small leaves; the flowers not seen.

Gen. Gualtherioid (No. 1). A very humble plant; the calyx fleshy and adherent, much as in Gualtheria.

(Prionotes Americana, Hook.? No. 1); see Lamarck, 365, 2. Nov. Gen.?, agreeing with the Epacrideæ, at least in habit. Growing in masses around the base of trees, becoming sometimes almost epidendric.

Empetrum? rubrum, (No. 3). A shrub, a foot or two high. Everywhere in great profusion, from the sea-coast to the mountain summits.

Pinguicula (No. 1). On moist declivities; somewhat rare.

Primula (No. 3); resembling P. farinosa. On moist declivities; rather frequent.

Gen. Anagallid. repens, (No. 1); Lysimachia of D'Urv., but in habit more like Anagallis. Somewhat rare.

Gentiana (No. 13, and No. 3 with spreading corolla); not the G. Magellanica. Frequent.

Hebe decussata, (No. 3). A highly ornamental shrub. Growing along the sea-coast; somewhat rare.

Ourisia (No. 1); allied to O. Magellanica of Poeppig, but the radical leaves round-ovate. In clefts of rocks along the sea-coast; rare.

——— (No. 2). Small; the calyx more deeply cleft than in No. 1; the flowers purple. In moist places on the mountains.

——— (No. 3). Minute; the flowers white. Around the snow-patches on the mountain-summits; rare.

Armeria (No. 2); referred by Gaudichaud to A. cespitosa of Poir. Growing exclusively, but not very abundantly, along the sea-coast; the only plant met with, that could in any way be regarded as maritime.

——— (No. 3); perhaps not distinct from No. 2, but nearly stemless. Met with only on mountain-summits.

Plantago? monanthos, D'Urv.; (No. 28). Root many-crowned; leaves more or less dentate; flowers single, axillary. Frequent on the rocks of the sea-coast.

———? (No. 29; a congener of the preceding). Congested into a carpet-like surface, marked out into stars by its radiating crowns of short rigid leaves. Only on mountain-summits.

Embothrium coccineum, (No. 1). A straggling shrub, much resembling a low Rhododendron. Growing only on stony hills of moderate elevation, where the soil seemed a little drier than usual.

Nanodea muscosa, (No. 1. Perhaps the most diminutive of all shrubs and woody plants); readily escaping observation, but for the solitary terminal berry on the surface of the sod. Frequent.

Fagus (Antarctica, No. 3; the hazel-leaved beech). In the forest, a tree thirty feet high; in the open ground, only a shrub; and on mountain-summits, a short prostrate vine, its branches not rising an inch above the sod.

(Nov. gen.? betuloides, No. 1); Fagus of authors; the "evergreen birch." Mainly constituting the forest; being in some rare instances, more than forty feet high.

Calopogon? Lessonii, (No. 1). In the forest; somewhat rare.

Witsena (Magellanica, No. 2). Cespitose; comb-like, projecting scarcely an inch above the sod. Rather frequent.

Gen. Anthericum-like (No. 1). A single terminal flower. On mountain-summits; somewhat rare.

Callixine marginata, (No. 1). Frequent; growing chiefly in the shade of the forest, or at no great distance from it.

Nov. gen. pumilum, (No. 1); Melanthium of Forster. In great profusion, often occupying extensive tracts of the subalpine upland.

Tetroncium (No. 1); Gen. of Endlicher, allied to Triglochin. Dicœcious; and having four stigmas. On moist declivities.

Juncus (No. 37). Stem and leaves articulate; the florets clustered.

——— (No. 38). A single terminal floret; the carpel large and black, obtuse. On the mountains.

Nov. gen.? grandiflorus, (No. 1); Juncus of authors. Abundant everywhere on the subalpine upland; extending through the boggy surface in linear comb-like files of upright stems.

Luzula (No. 9). Resembling L. spicata. On the mountains.

——— alopecurus, Desv.? (No. 10). Larger than No. 9, with the florets more numerous. On the subalpine upland.

Gaimardia Australis, (No. 1). On the mountains.

Gen. near Scleria (No. 1); the young unexpanded spikes compressed, much as in Abilgaardia. Frequent on the subalpine upland.

——— (No. 2). Larger; black-fruited. Frequent.

Carex (No. 79). Strongly resembling C. cespitosa. Short. Growing on moist declivities on the mountains.

——— (No. 80); much like C. atrata.

——— (No. 81); allied to C. paupercula. A single spike; the fruit reflexed.

——— (No. 82). Having a single spike.

———? (No. 83). Habit of Schœnus; a single spike, the fruit rostrate. Growing on mountain-summits.

Uncinia (No. 4); Carex-like. Found besides at "Good-Success Bay" by Mr. Rich.

Oreobolus obtusangulus, Gaud.? (No. 1). Cespitose. Growing on the mountains.

Isolepis brevis, D'Urv.? (No. 7). Small; and cespitose. Growing on the mountains.

Gen. Gramin.? (No. 1); compare Diplacrum of the Voyage of the Coquille, Pl. 26. Dwarf; and cespitose. Growing on the mountains.

Alopecurus Magellanicus, Lam.? (No. 5). A tall species; glaucous. Growing along the sea-coast.

Phleum (No. 4). Abundant along the sea-coast.

Stipa? (No. 16); the florets small. Growing on the mountains.

Agrostis (No. 28); panicle confert., coarctate; with the florets awned.

——— (No. 29); panicle diffuse; with the florets small, and awned. "Good-Success Bay," Rich.

——— (No. 30); the florets unawned.

(Wilfa, No. 2; or compare) Sporolobus; much resembling our W. clandestina, but gladiate. Growing along the sea-coast; and also on mountain-summits.

Ampelodesmos Australis, (No. 1); see Coquille, Pl. 6. Arundo-like, with villous florets. Growing on the subalpine upland; somewhat rare.

Hierochloa Antarctica, (No. 4); see Coquille, Pl. 30. Abundant along the sea-coast.

Aira flexuosa? (compare No. 9 of our Atlantic States). Tall. Growing along the sea-coast.

——— (No. 10). The leaves short and upright. On mountain-summits.

Trisetum phleoides, D'Urv.? (No. 4); much like our White Mountain T. subspicatum.

——— (No. 5); perhaps a second smooth species.

Poa (No. 18). A small species. Rare.

——— (No. 19); much like P. pratensis. Rare.

——— (No. 20).

——— (No. 21); much like P. nemoralis. Short. "Good-Success Bay," Rich.

Festuca erecta, D'Urv.; (No. 12); see Coquille, Pl. 7. Viviparous; the florets having short awns. Growing on the tops of hills.

——— (No. 13). Viviparous; the awns longer than in the preceding species. Abundant along the sea-coast.

Bromus (No. 8). Large, and pubescent. "Good-Success Bay," Rich.

Agropyrum (compare No. 7 Patagonia). Much resembling A. repens var. glaucum (of the salt-marshes around Cape Ann on our Atlantic Coast). Growing in great profusion along the sea-coast.

Lycopodium (No. 50). Creeping; the spikes solitary, sessile.

——— (No. 51); the scales longer, besides other distinctive marks.

——— (No. 52); perhaps a third species. Its spikes in threes, or three together in peduncled clusters.

Hymenophyllum (No. 20); resembling H. Peruvianum of the Vicinity of Quito, see Hooker, Pl. 208. Among mosses, in the shade of the forest.

——— (No. 21); compare H. multifidum of Forster, attributed to the Pacific islands. Among mosses, in the shade of the forest.

——— cespitosum, Gaud.? (No. 22).

Gen. incert. (No. 1; Hymenophylloid?); the fructification not seen. Intermingled among alpine plants.

Polypodium (No. 52); or compare Grammitis. Scarcely half an inch high; the frond simple, devoid of a midrib. Growing in the forest, and throughout the open country to the summits of the highest mountain peaks.

——— (No. 53); compare Grammitis. Frond larger than in the preceding species, and having a distinct midrib. "Good-Success Bay," Rich.

Blechnum? (No. 11); resembling B. trilobum collected by Gillies, see Hooker, Pl. 192. Frequent.

Lomaria (No. 10); resembling L. Gilliesii, see Hooker, Pl. 207. Large, (and luxuriant). Growing in the forest.

Asplenium? Magellanicum, (No. 59); the species collected by Commerson, see Hooker, Pl. 180.

Aspidium (No. 33); or compare Nephrodium. Resembling N. marginale; large and tall; the stipe paleaceous. "Good-Success Bay," Rich.

———? mohrioides, (No. 34); see Coquille, Pl. 35. Stipe paleaceous; frond coriaceous, the segments crowded, horizontal. Rare.

Woodsia (No. 5); resembling W. incisa collected by Gillies, see Hooker, Pl. 191. In the shade of the forest; somewhat rare.

Gleichenia (No. 9). In the forest; rare.

Riccoid (No. 1). Frond long, narrow and branching; the fructification not seen. Frequent in pools; being the only plant that could be regarded as really aquatic.

Anthoceros (No. 3). Very abundant in the shade of the forest.

Jungermannia (No. 30). Having long upright stems, crowded together in beds. Subaquatic; being partially immersed in pools, often more deeply so than the Sphagnum.

——— (No. 31). With various other species, growing in the shade of the forest.

———? (No. 32). Stout; the frond very succulent and fleshy, buried in the soil in (denuded) open places.

Gen. near Jungermannia (No. 1); the capsule, or spore-case, as in Jungermannia, except that the four valves remain united at the apex. When first collected, the capsule resembled an unexpanded one of Jungermannia; and under the lens, was observed to be filled with three-lobed sporules intermingled with spiral filaments: in drying, the valves expanded in the middle and scattered the sporules; but on being moistened, the solid form was resumed. In the shade of the forest; rare.

Dicranum (No. 12). In the shade of the forest.

Trichostomum? (No. 6). On the branches of trees, and elsewhere.

Gen. Musc. (No. 1). Entirely blackish. Frequent on the tops of hills, giving to the ground the appearance of burnt districts.

Polytrichum dendroides, Hook.? (No. 9). In the shade of the forest.

——— (No. 10). The stem simple. In the shade of the forest.

Hypnum (No. 23). In the shade of the forest.

Sphagnum (No. 5). In wet bogs.

——— (No. 6). In wet bogs; frequent.

Musci incerti. Various other mosses, of different genera; and chiefly growing in the shade of the forest.

Lecidea atrovirens? (compare No. 1 Hawaiian mountain-region, summits of the White Mountains of New Hampshire), and L. geographica. Closely adhering to the terminal rocks of the highest mountain-peaks.

Cenomyce rangiferina? (compare No. 4 Hawaiian mountain-region, our New England States, and No. 5 New Zealand). Frequent on the mountains.

——— pyxidata? (compare No. 13 of our New England States).

——— (No. 14). Several other species.

Lecanora (No. 7); resembling L. tartarea. Abundantly incrusting the terminal rocks of the highest mountain-peaks.

Physcia sepiacea, Gaud.? (No. 1).

Usnea melaxantha? (No. 5, compare sp. of Torrey from the South Shetlands). Adhering in separate tufts to the terminal rocks of the highest mountain-peaks; conspicuous, and abundant.

Peltidea (No. 1).

Lichenes incerti. Various other Lichens, belonging to different genera.

Agaricus fimetarius? (No. 21). A delicate, and very small species. Met with in two or three localities.

Negative Characters. In connection with the above-mentioned instances of leaves seemingly deciduous, some approximation to an *annual* plant was presented in *Lagenophora Commersonii;* judging at least by the slightness of its root.

The forest, as well as the open country, proved to be entirely devoid of vines, whether prostrate or twining, woody or herbaceous: the only approximation being the alpine form of *Fagus Antarctica*, already-mentioned. We met with no signs of genuine bulbous-rooted plants.

The following Tribes of plants were not met with; and were ascertained by Gaudichaud's List, to be likewise absent from the Falkland Islands:

Polygalaceæ,	Convolvulaceæ,	Polygonaceæ,
Malvaceæ,	Boraginaceæ,	Euphorbiaceæ,
Hypericaceæ,	Solanaceæ,	Coniferæ,
Terebinthaceæ,	Labiatæ,	Alismaceæ,
Leguminosæ,	Verbenaceæ,	Liliaceæ,
Cucurbitaceæ,	The genus Statice,	Araceæ, and
Lythraceæ,	Salsolaceæ,	Typhaceæ.
Apocynaceæ,	Amaranthaceæ,	

The absence in these extreme Southern countries of the Leguminosæ is especially remarkable; and that of the Coniferæ, Polygonaceæ, and Salsolaceæ, hardly less so.

Further comparison with the Falkland Islands. At the distance of one hundred and eighty-five geographical miles from Staten Island (the Eastern extreme of Terra del Fuego), the Falkland Islands present a land surface of about "two thousand" square geographical miles, included between S. lat. 51° and 52° 30′. The soil, climate, and vegetable growth, as described by Gaudichaud and D'Urville, are altogether the same as on the main land of Terra del Fuego; not only the absent, but the prevailing Tribes of plants being the same, as well as most of the species; but the number of species is diminished.

The fact of there being "no trees upon the Falkland Islands," will account for the absence of all *woodland plants;* but hardly for that of *Pernettya acuminata* or the bush-cranberry, *Escallonia serrata*, *Embothrium coccineum*, and some twenty of the most abundant open-ground Fuegian species of plants.

On the other hand, Gaudichaud's List includes about thirty species of plants growing on the Falkland Islands, that we did not meet with in Terra del Fuego: the most remarkable being Oxalis enneaphylla, Myriophyllum elatinoides and M. ternatum, Valeriana sedifolia, Calceolaria Fothergilli, Chloræa Gaudichaudii, Sisyrinchium filifolium, Trichomanes flabellula, and Schizæa Australis.

Of Ferns and Phænogamous plants indigenous on the Falkland Islands, one hundred and eleven species are enumerated by Gaudichaud:* deducting the above thirty, would leave eighty-one species ascertained by ourselves to be common to Terra del Fuego: while our remaining eighty-nine species seem not to occur on the Falkland Islands.

Comparison with Northern Patagonia. At the distance from the Rio Negro of only fourteen and a half degrees nearly due South, the vegetable growth presented but two species in common; the *Apium* (whose identity was not at the time suspected), and the *Agropyrum*. Even the Falkland Islands furnish but one additional species, the *Limosella:* for the Callitriche, on Gaudichaud's List, has not as yet been observed at the Rio Negro.

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* Settlements having been attempted by Europeans on the Falkland Islands, where the imported "cattle and horses have run wild and sustained themselves," the following fifteen plants on Gaudichaud's List were doubtless also introduced by the settlers:

"Poa annua,
—— compressa,
Lolium perenne,
Cerastium vulgatum,
Stellaria media,
Sonchus oleraceus,
Senecio vulgaris,
Achillea tomentosa,
Veronica serpyllifolia,
Urtica urens,
Thlaspi bursa-pastoris,
Rumex patientia,
——— acetosa,
——— acetosella, and
Trifolium repens:"

We saw none of these species in Terra del Fuego; nor any other, liable in the slightest degree to the suspicion of having been introduced from abroad by foreigners. But as the Vincennes remained several weeks in Orange Harbor, and procured there a supply of wood and water, it is possible, that some domestic weeds, unintentionally disseminated, may be found there by subsequent visitors.

Tropical analogies. The forest at Orange Harbor contained large Ferns, growing in luxuriance; and in one or two localities, the aspect was rendered eminently Tropical, by the presence of a *Gleichenia;* in addition to the abundant intermingling of *Hymenophylleæ* everywhere among the wet mosses in the shade. In the open ground, the diminutive *Myrtus* belonged to a Tropical genus: and the Coffeaceæ were present in *Nertera*, a genus, however, occurring between the Tropics only on mountains.

North American analogies. At this immense distance from home, an *Osmorhiza* among the woodland plants unexpectedly brought North America to mind: the accompanying *Ribes* contributed to heighten the resemblance; as also, the *Agropyrum* growing by the sea-side.

European analogies. A European resemblance was barely distinguishable; being traceable only, in the frequent occurrence of *Cichoreæ*, and in the presence of an *Armeria*.

Boreal analogies. About one-half of the genera occurring at Orange Harbor, will be observed to be common to wintry climates in all parts of the Globe. But I was greatly surprised at the number of species indistinguishable, as far as I could judge from memory, from those growing in the extreme North: as, a *Primula* like P. farinosa, a *Galium* like G. aparine, a *Galium* like G. trifidum, an *Apium* like A. graveolens, a *Cardamine* like C. hirsuta, the *Stellaria debilis* of D'Urville, a *Cerastium* like C. lineare, a *Carex* like C. paupercula, an *Aira* like A. flexuosa, a *Trisetum* like T. subspicatum, besides certain other grasses: but in some of these instances, a critical comparison of specimens may probably bring to light specific differences. On the other hand, the gen. *Saginoid*, though so much resembling, is in reality only a counterpart to the Sagina procumbens of the extreme North.

The continuous connection or prolongation upon the summits of the Andes. Of the remaining and more characteristic genera, many will be perceived to be such as occur throughout, along and upon the whole range of the Andes.

On the 26th of February, the Relief sailed from Orange Harbor; and the wind being fair, we congratulated ourselves on the prospect of reaching on the following day, the nearest Passage into the Straits of Magellan. But during the night, the wind became adverse.

On the 27th, and for several successive days, the Relief continued beating against wind and current Westward along the coast: the

weather thick and rainy, the wind violent, one gale following another; in confirmation of King's statement, that March here is the worst month in the year for Navigation.

Twice the Relief approached very near the coast; and the last time, was caught in a gale on a "lee shore," from which we got clear with some difficulty. The Relief next stood off from the land, proceeding nearly as far as "58° S. lat.;" the point reached on this occasion being the most Southern ever visited by myself.

On the 17th of March, we were returning rapidly to the coast, having the prospect of reaching by the morrow Noir Island Roads: described as affording excellent anchorage.

The wind shifted back to the Southwest during the night, and on the 18th, increased to a heavy gale with thick weather and hail-squalls. The sun for a few moments became distinguishable through the clouds, enabling Lieutenant Sinclair to take an observation. He quickly brought his work to Captain Long, with whom I happened to be conversing, and stated, that the position of the vessel was that of the Tower Rocks: the words were hardly spoken, when from the look-out forward the cry came, "Rocks! rocks under the bows!" Captain Long decided to "weather," or hold his course; and as we passed them, the Tower Rocks presented a magnificent and fearful spectacle; the sea at times shearing in a smooth, unbroken sheet completely over the tall summit of the outer one; the display of power carrying conviction, that if a vessel should strike but once, there would be nothing left but fragments.

Continuing on, the Relief rounded the Southeast Point of Noir Island about 5 P.M.; and standing in towards the land, three anchors were let go in "twenty fathoms" of water, and were observed to take fast hold. Before retiring in the evening, I heard one of the officers remark, that "a few such days as this would make a man turn grey:" the mistake appeared in the sequel.

On the morning of the 19th, Noir Island, "six hundred feet" in elevation, presented a distinct cap of snow, or possibly of hail. The wind having somewhat abated, and a slight opening being observed in the land, like a boat-harbor, I looked forward to the possibility of landing: but an old Sealer, whom we had with us as a sort of pilot, informed me, that he had been "going to sea for forty-five years, and had never before seen such heavy riding." The Relief, in fact, happened to be provided with the anchors and chains usually assigned to

vessels of a larger class. In the afternoon, the wind increased again, and our fourth anchor was let go. The surf beating tremendously on the rocky shore and ledges, presented a novel aspect; a shooting up in columns, like the effect of mirage, and in wild violence plainly suggestive of crashing bones. After dark, the wind shifted to the Southward, inclining East, blowing yet more heavily and throwing in the sea; when, with all four anchors down, the ship commenced dragging. Fortunately, this did not last long; but the wind gradually lessened, at the same time veering back to the Southwest.

On the morning of the 20th, the whole island was observed to be sprinkled with snow. The wind had moderated, and the position of a buoy indicated the loss of one of our anchors: in getting in the chain, we discovered that another and our largest anchor was also gone. It now became evident, that the ship could not ride out another night like the last, and the weather was scrutinized with anxiety. About 8 P.M. the wind shifted precisely as on the previous evening, blowing heavily; and the ship commenced dragging, the growling of the chains as they lifted over the bottom being distinctly audible. That the fate of the Relief would be ever known, for two days seemed improbable; and at length, the crisis came. The vessel dragging towards the end of a rocky ledge, was on reaching it struck by a wave on the bows, which at once parted us from our anchors. We did not, however, touch the rocks, notwithstanding the direction of the wind; for the water piling against the island, seemed to give rise to a current, which in sweeping us past kept the vessel clear. When at last the Point of the island bore "South of West," the anchor-chains were slipped, the vessel was put under sail, and we were saved.

On the morning of the 21st, the land was in sight to the Northward, as far as Cape Glocester; the weather being fine and clear, except as was remarked, over Noir Island, which still continued visible. The Relief having lost her anchors, was now on her way to the nearest port where the deficiency could be supplied.

In the evening of the 22d, we were some thirty miles from Cape Glocester; which was the last land we saw in Terra del Fuego.

The wind was very light during the 23d, and continued light on the 24th. On the 25th, the weather again became thick; and towards evening, the wind increased to a gale.

On the 26th, the latitude was "54° S.;" the weather being fine, and

the wind fair. The breeze continued fair on the 27th, and the weather fine; the latitude gained being "52° 45′ S."

3. Araucania.

In proceeding North along the Continent, the Relief having now no anchors, was obliged to keep at a safe distance from the land; too great to afford us a view of any part of Araucania. On the 28th, the sky was overcast, accompanied with drizzling rain: the latitude gained being "52° 15′ S."

On the 29th, the weather was unpleasant, with a strong wind; the latitude gained being "51° 19′ S." On the 30th, the sky was overcast, and the weather unpleasant; the latitude gained being "50° 35′ S." On the 31st, the weather was fine, with a clear sky throughout the day.

On our way North, the temperature on the 1st of April was for the first time agreeably warm; the latitude gained being "47° 05′ S." On the 2d, there was a fine fair breeze, and we gained the latitude of "44° 54′ S."

On the 3d, the wind was adverse and very light, the sun in the morning feeling quite warm. On the 4th, the weather was rather thick, accompanied with drizzling. On the 5th, the weather was fine, and the wind light; the latitude gained being "40° 56′ S."

On the 6th, the latitude gained was "40° 01′ S.;" towards evening a storm arose, continuing through the night. On the 7th, the latitude gained was "39° 43′ S." On the 8th, heavy rain fell at intervals during the morning.

On the 9th, the latitude gained was "37° 57′ S." Living specimens of an Araucanian plant brought from the coast in this neighborhood, were seen some days later in the city of Valparaiso.

During our subsequent visit to California, Mr. Robert Davis, a highly educated and intelligent Hawaiian, gave me specimens of two flowering plants which he gathered in the Straits of Magellan. As compared with the vegetable productions of Southern Terra del Fuego, they already presented a different aspect:

Fuchsia coccinea, (No. 2). Growing on the shores of the "Straits of Magellan," where the specimen was collected by Mr. R. Davis.

Philesia buxifolia, (No. 1). Growing in company with the preceding plant on the shores of the "Straits of Magellan;" observed and collected by Mr. R. Davis.

Lapageria (No. 1). The flowers large, red, and highly ornamental; having, besides the petals, a green herbaceous calyx. As the plant "will not flower at Valparaiso," specimens are "imported in the living state from Conception," farther South.

4. Chili.

The course of the Relief inclining gradually towards the land, we found ourselves at noon on the 11th, only "about fifty miles" South of Valparaiso. A calm ensued in the evening.

The calm continued on the morning of the 12th: at 8 A.M., the fog clearing a little, we discovered the land, seeming only five or six miles distant; and obtained soundings in "eighty fathoms." The fog, however, soon closed in, and the weather continued calm and foggy throughout the day.

On the 13th, just before daybreak, every one was called on deck, to witness a glorious and wonderful spectacle. There was darkness all around, except an illuminated network close to the horizon in the East; this was an outline of the Andes, the peaks exceedingly diminished by the immense distance, but marked out by an attenuated thread of light of the lustre of the sun itself. As the sun rose from behind, the vision vanished; and we sailed onwards for hours under a clear sky, before the land again became visible.

On the 15th, the Relief entered the slight indentation called the harbor of Valparaiso, situated in "33° S. latitude," and was anchored in front of and under the lee of the city. The vessel remaining there several days, afforded time for a journey to the snows of the Andes.

Face of the country, and geological structure. The coast on either side of the city, with the exception of a sea-beach six miles North and another a like distance South, presented a continuous rocky cliff rising out of the sea, and for the first two hundred to five hundred feet in many places inaccessible. The ground beyond rose steeply to the height of some two thousand feet, and then became a table-land; bearing detached mountains and long parallel mountain-ridges, but preserving much the same average level to the foot of the Andes. These in a vast continuous range rise steeply to a very great elevation; the crest, difficult of access in an uninhabitable neighborhood, forming the natural and political boundary of Chili.

For the first fifty miles from the sea, the rock was observed to be granitic; of the variety termed *gneiss*, laminated from the more or less preponderance of mica, in other places fine-grained, and sometimes passing into hornblende-rock; presenting great local variation in its

ingredients; but in general, rapidly disintegrating, crumbling, yielding to the rains, in some places decomposing in situ into banks of clay; and in one observed instance, from the breaking up of veins, forming a sort of pseudo-conglomerate. The easy slopes of the mountains seemed in some degree due to the yielding character of the rock; for in the normal granite of Brazil, almost every eminence presented inaccessible surfaces.

Beyond Coracovi, with the mountain-ridge, a trachytic or *trap* formation commenced; the rock being close-grained, full of fissures, easily decomposable, and unattended, as far as I could discover, with any marked change in the configuration of mountain-surfaces. This trap formation extended to the limit of our excursion: but on the upper portion of the Andes, there was a large intermixture of chlorite, of jaspery aluminous rock, and according to Mr. Dana, of *conglomerate*.

Climate. By astronomical calculation, April, the month in which we arrived, should be the middle autumn month of the Southern Hemisphere. The country was everywhere parched and brown; and of the thinly-scattered vegetable growth, the *annual plants* and most of the *grasses* were withered and dry. During our stay, the sun was much of the time obscured by clouds, and never very powerful; woollen under-garments, usually oppressive in the daytime, proving always grateful in the cool evenings.

Rain fell in the night of the 22d, and in sufficient quantity to render the road muddy during the forenoon of the following day; a decided freshening at once became manifest in the vegetable growth. This was the first rain of the season; and according to the testimony of residents, the rains at Valparaiso "are always light, and fall almost exclusively during the winter; which is the season of flowers, and of humming-birds, and the only part of the year when the hills are green." At this time also, *bulbous-rooted* plants may make their appearance. The temperature was said "never to descend below 58° Fahr."

One of the finest sunsets within my experience, I witnessed from the heights back of Valparaiso; the tints less varied and less brilliant than often at home; but there was sombre grandeur in the heavy clouds hanging in the East over massive mountains, the intervals between revealing the far-distant Andes; while, in looking West, down upon the sea, the whole of its wide expanse was changed in color to deep reddish-purple.

The aspect of the landscape and the growing plants indicated a cli-

mate too arid for a forest-region: yet the country could not be regarded as altogether unwooded; the foliage on trees and shrubs, even in deep ravines, was devoid of luxuriant freshness; but nowhere below the middle region of the Andes, were there any signs of extreme aridity.

Environs of Valparaiso. Even from our anchorage, the prominence in the landscape of Tropical genera was very striking. A columnar *Cereus* in the distance, here and there projecting upright; and *Bromelias*, all decumbent in conspicuous patches on the ground, some of them fifty feet in diameter from a single central root. On reaching a ravine back of the city, stocks of a palm, *Cocos Chilensis*, came into view. Other Tropical forms soon made their appearance; as, a scarlet-flowered *Loranthus*, parasitic and conspicuous on bushes; *Chusquea quila*, a kind of dwarf bamboo; *Vachellia cavenia*, belonging to the Mimoseæ; a Chrysophyllum-like *Lucuma;* a *Cestrum;* a *Boerhaavia;* and several *Myrtaceæ*. The presence of some of these Tropical forms seemed traceable to the vegetative process being never interrupted by a winter of cold: yet after excluding those above-named, the vegetable growth presented as little of the Tropical aspect as at the same distance from the Equator in any other part of the globe.

In ascending the ridges of the mountain-slope back of Valparaiso, these were found to be sterile, with a considerable proportion of the soil bare; yet supporting large, isolated, clustered shrubs, four to nine feet high, growing wide apart, and very uniformly many-stemmed: as, *Sphacele Lindleyi; Lobelia polyphylla*, with its long scarlet flowers; *Boldoa fragrans; Gardoquia Gilliesii; Calceolaria integrifolia;* three or four species of *Baccharis;* the *Colliquaja*, persistently rendered scarlet by a parasitic Loranthus; the strange, aphyllous, green-spined *Colletia;* and in tangled masses, agreeing in outline with the clustered shrubs, the long herbaceous twining stems of *Polygonum (Helxine) tamnifolium*. Here and there, as already intimated, a stock of the upright columnar *Cereus* rose six to twenty feet high; or in other instances, the tall flower-stem of a *Bromelia*.

The intervals between the clustered shrubs, sometimes many acres in extent, were occupied by a thinly-scattered growth of very humble plants: as dried-up *grasses;* two *Dichondras; Paronychia? ramosissima; Margyrocarpus setosus;* several *Aplopappi* and *Gnaphaliums*, and other depressed *Compositæ;* and especially, a nearly stemless blue-flowered *Ruellia*, singularly corresponding to our Northern upland

Violas. On the naked plateau above, whole tracts were rendered yellow by a low-growing, one-flowered *Oxalis*, leafless, at least at this season; while here and there a Pandaniform tuft of the radical leaves of *Eryngium paniculatum?* took the place of isolated shrubs.

Returning lower down, the vegetable growth in the ravines between the ridges, proved fresher and more vigorous; the above-mentioned shrubs being intermingled in thickets with others not seen on the barren ground above: as several *Myrtaceæ;* various species of *Escallonia;* a smooth *Ribes;* the *Drymis* or Chilian magnolia; *Fuchsia macrostemma;* and even a woody vine, a five-leaved *Cissus*. Where there was running water with shaded banks, at the bottom of the more deep and narrow ravines, *Ferns* made their appearance, intermingled here and there among the shrubs: also, various freshly-verdant herbaceous plants; as two or three *Calceolarias*, *Eupatorium glechonophyllum*, a *Galium*, a *Lathyrus*, and others.

In the general absence of marshy ground, some wet springy spots were met with, containing small herbaceous plants; as two species of *Hydrocotyle*, *Limosella tenuifolia*, a Gratiola-like *Mimulus*, and a congener of the Fuegian *Anagalloid*.

Back of the two sea-beaches, the one six miles North and the other a like distance South of Valparaiso, were shallow pools, filled in great part with a *Scirpus* resembling S. lacustris. These marked the termination of a stream of water coming from the Interior, in a wide sandy river-bed; the exposed portions in both instances bearing scattered bushes of a "chilquilla" or willow-leaved *Baccharis*, an occasional small tree of a true willow or *Salix*, and conspicuous clusters of the *Chusquea*, or dwarf bamboo, fifteen feet or so high, but resembling in outline the gigantic nodding species of Brazil.

The bordering hills, gently-sloping and of inferior elevation, presented a somewhat Tropical aspect in the presence of a *Cestrum*, an almost arborescent showy-flowered *Cassia*, and a tall shrubby *Eugenioid?*. Other tall shrubs being abundantly intermingled, as *Aristotelia* and *Psoralea glandulosa;* also various herbaceous plants, as a tall and branching small-flowered *Senecio*, an *Alonsoa*, *Argemone grandiflora*, and an occasional stock of the coarse Rheum-leaved *Gunnera scabra*.

Of other plants, frequent here and generally in the lower environs of Valparaiso, may be mentioned: the *Duvaua*, rarely twenty feet high, the trunk, in one instance, three feet in diameter; various large

shrubs belonging to the Compositæ, as *Eupatorium salvia*, *Flourensia thurifera*, *Euxenia mitiqui*, and *Proustia;* other large shrubs, as the pubescent variety of *Rhus? caustica*, the *Teucrium bicolor*, the *Azaras*, the *Fuchsia rosea*, remarkable for its flowers appearing before the leaves, the showy yellow-flowered *Sophora macrocarpa*, and the *Adesmia microphylla;* and of herbaceous and humble plants, a *Verbena*, *Linum aquilinum* with its yellow flowers, *Wahlenbergia linarioides*, an *Acæna*, two or more *Oenotheras*, *Noticastrum adscendens*, two or more *Plantagos*, and *Quinchamalium Chilense.*

There yet remains one locality that seems to require separate notice: about twelve miles South of Valparaiso, a mountain-ridge begins to project above the general level, extending immediately along the coast. The increased elevation so near the ocean bringing an increase of humidity, the ravines present some approach to a forest. The *Piptocarpha excelsa* here made its appearance, a tree belonging to the Compositæ, forty feet high, with appressed branches and the trunk two feet in diameter; an accompanying *Eleagnus?* and an *Ilex?*, both became spreading trees of hardly inferior elevation; an *epidendric fern* even creeping on their trunks and branches; while intermingled among the trees, the *Chusquea*, no longer a dwarf bamboo, attained the height of full thirty feet. The summit of this mountain-ridge was found covered with trees of the *Eugenioid chekan?* thirty feet high, with the trunk two feet in diameter, intermingled with large arborescent shrubs, as other *Myrtaceæ* and the *Poeppigia;* all somewhat gnarled from mountain exposure, and their extreme branches bearing a *Viscum-like* mistletoe, seen only on this elevated spot.

Interior Chili. On the 18th, our party proceeded from Valparaiso Eastward in wheel-carriages. Ascending to the table-land, its surface for the first four or five miles proved gently undulating, then declining perceptibly, and gradually subsiding into a narrow plain hemmed in by mountains, where we arrived at the small village of Casa Blanca. Farther on, at the end of this plain, we crossed a longitudinal mountain-ridge "forty miles from Valparaiso;" the ascent and descent being about equal, we next entered upon another and very similar plain, all the way hemmed in by mountains, and containing the small village of Coracovi; where we stopped for the night.

At 4 A.M. on the 19th, we again set out, and at sunrise reached a Second and more elevated longitudinal mountain-ridge; the descent proved much shorter than the ascent, and we next entered upon a

third plain, wide and level, containing the river Maipu, and extending beyond Santiago to the base of the Andes.

Throughout the Interior, the vegetable growth differed very little from that around Valparaiso, except that within a given space there was less variety. The low herbage was everywhere too thinly-scattered to conceal the color of soil; while the isolated shrubs were chiefly confined to mountain-slopes, the ground where tolerable level, being altogether devoid of them. The *Maytenus*, an exceedingly graceful little tree, twenty to twenty-five feet high, was here and there met with, its leaves distichal or standing off from the long pendent branchlets, rendering the aspect altogether unlike that of the weeping willow.

In one locality, large trees were met with; in a depression having much of the character of a river-flat, but devoid of running water, at the Western base of the Second mountain-ridge. These trees were standing wide apart; and consisted of the *Quillaia*, no longer an arborescent shrub, but a spreading tree, sixty feet high with the trunk three feet in diameter; associated with the *Laurus? peumo* nearly equal in dimensions.

On this Second mountain-ridge, a different *Bromelia* took the place of the coast species; and soon the isolated bushes were found to consist principally of the Acacia-like *Vachellia cavenia*, now the prevailing shrub.

The exposed portions of the river-bed of the Maipu presented a green and flourishing vegetable growth, in strong contrast with the barren country around: consisting of a large dock-leaved *Senecio;* a second species of "chilquilla" or willow-leaved *Baccharis;* an *Equisetum* eight feet high, having whorled branchlets a foot in length; and among a variety of other plants, the *Mimulus rivalis?*, well known in Northern gardens from the conspicuous purple spot on its yellow corolla.

From the city of Santiago, the view of the Andes seeming near at hand, was very imposing. From the thinness of the vegetable growth, the local changes in the color of soil and rocks become visible in the distance, in a very great variety of dull hues, especially of red and green. As the sun went down, the upper portion of the Andes changed to a clear yellow; deepening shadows bringing into bold relief peaks and ridges without end in countless array; a little later, presenting a universal glow of red. During all this time, the sky in the West continued greenish; a tint not unusual in Chili, and by some

attributed to the "reflection of the all-pervading yellowish dusty soil in the clear blue of the atmosphere."

On the 20th, we left Santiago soon after 4 A.M., journeying in the same wheel-carriages Eastward; towards the Zodiacal light, which was very distinct. At the end of "five leagues," we arrived at the spot where the snow-carts for supplying the city are loaded; and where it became necessary to take horses. Continuing on, the ascent proved gradual and very constant; the vegetable growth unchanged except in the ravines; where the *Quillaia* and *Kageneckia* were now prevalent; and two or three *Escallonias* not before met with also attained the dimensions of small trees; while of intermingled shrubs, the smooth variety of *Rhus? caustica* became frequent, and a leafy *Colletia*, a softly-pubescent *Ribes*, and a *Buddleia*, first made their appearance. The *Eccremocarpus scaber*, an ornamental woody vine, growing on the ground in detached dense beds, was seen only on this basal portion of the Andes.

Character and composition of the Vegetable Growth. From the sea to the middle region of the Andes, as far as the vegetable growth came under observation, there seemed to be seven prevailing Tribes of plants, occurring in the following order of frequency:

1. *Compositæ.* Including one species that forms a tree; and several, becoming large shrubs more or less arborescent.

2. *Graminaceæ.* Very generally diffused throughout the country; but at the time of our visit, chiefly withered and dry. Including in the ravines and low ground, some large reedy species: as the *Chusquea* or dwarf bamboo, a *Deyeuxia*, and a *Phragmites.*

3. *Leguminosæ.* Consisting principally of shrubs.

4. *Labiatæ.* Unexpectedly in this Tribe of plants, consisting principally of large shrubs.

5. *Rhinanthaceæ.* Consisting chiefly of herbaceous species; but including some large shrubs.

6. *Rhamnaceæ.* Holding the sixth place; from the frequency, wherever bushes occur, of the *Colletias.*

7. *Myrtaceæ.* Chiefly large shrubs; some of them arborescent, and one species becoming a tree of medium size.

Next in order, the following Tribes of plants were observed to be abundant: the *Azaras*, all of them shrubs; *Rosaceæ*, including the *Quillaia* and *Kageneckia*, and some herbaceous and humble genera; *Onagraceæ*, from the frequent *Fuchsias* and *Oenotheras; Cactaceæ*,

from the general diffusion of the columnar *Cereus; Escallonieæ*, the species numerous; *Umbelliferæ; Loranthaceæ*, from the general diffusion of the conspicuous scarlet-flowered *Loranthi; Verbenaceæ; Solanaceæ; Plantaginaceæ; Polygonaceæ; Euphorbiaceæ*, from the frequent *Colliquaja;* the *Boldoa fragrans*, frequent all over the country; *Sisyrinchiums;* and *Bromelias.*

Among the more remarkable plants: the Chrysophyllum-like *Lucuma* and the *Lardizabala*, were seen only in a very deep ravine facing the sea, about three miles South of Valparaiso.

The most characteristic botanical feature, consisted in the presence of *Nolanaceæ;* an Austral-American Tribe of plants, confined chiefly to the Western side of the Andes, to Chili and Peru. A more striking peculiarity was presented in certain *Sisyrinchiums* with broad gladiate leaves, in the absence of flowers readily mistaken for and entirely corresponding to the Irises of the Northern Hemisphere.

The following plants were found growing in Chili, between the sea at Valparaiso and the elevation of 6000 feet on the Chilian slope of the Andes:

Ranunculus (No. 24); near R. Chilensis, but the carpels beaked. In wet places.*

Drymis Chilensis, (No. 2. A shrub). Growing in mountain-ravines back of Valparaiso.

Lardizabala biternata, (No. 1). A woody vine, having the habit of Paullinia; pubescent; leaves biternate, provided with stipules; the flowers purple, large. In a deep and remarkable mountain-ravine, facing the sea, about three miles South of Valparaiso.

Berberis actinacantha, Mart. (No. 4); the thorns having five branches. On the heights or mountain-slope back of Valparaiso.

——— flexuosa? (No. 5). Habit of the preceding; long trifid thorns; leaves entirish, glaucous beneath. Beyond Casa Blanca, growing among quillai trees.

Argemone grandiflora, (No. 2; a well-marked species). Growing in the neighborhood of the sea-coast; on the sand-plain at the mouth of streams, and elsewhere.

Cardamine Chilensis, Dec. (No. 12; compare No. 11 Terra del Fuego), and C. flaccida of Cham. Habit of C. hirsuta, but the flowers large. Wet places in the environs of Valparaiso.

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*Corydalis. The "flowers yellow, tipped with a purple spot. Near the sea-coast," Brackenridge. Probably introduced.

Gen. Reseda-like. Diminutive caducous leaves. On the "road to Santiago," Brackenridge.

Silene; compare S. Gallica. Annual; low and leafy; flowers flesh-colored, the petals fauce coronata. On the sands of the sea-shore; perhaps not indigenous.

Citrus aurantium, (bis Zanzibar, Egypt, Madeira, and Brazil). Oranges for sale in the market.

Azara integrifolia? (No. 1); the flowers in axillary racemes. Near the windmills, on the mountain-slope back of Valparaiso.

——— (No. 2). Habit of Zizyphus; leaves crenulate, reticulate on the under surface. Environs of Valparaiso.

——— (No. 3); leaves attenuate.

——— (No. 4). Habit of Prinos; the flowers four-parted. Found by Mr. Brackenridge.

Monnina linearifolia, Ruiz & Pav. (No. 1). On the heights or mountain-slope back of Valparaiso.

Frankenia? (No. 4). Maritime; frequent on the sands of the sea-shore.

———? (No. 5); apparently a second species. More pubescent. On barren hills in the environs of Santiago.

Stellaria? (No. 13). The leaves large, cordate, petioled. Growing in wet places in the ravines of the environs of Valparaiso.

Spergularia (compare No. 3 California and No. 5 North Patagonia). "Valparaiso," Brackenridge.

(Sphæralcea? No. 1); Nuttalia, or compare Malva. Small; the segments of the outer calyx linear; flowers purple, and small. Environs of Valparaiso.

Aristotelia macqui, (No. 1). A shrub, ten to fifteen feet high, with the branches few and straight. Frequent in the environs of Valparaiso, and elsewhere.

Cissus (No. 35). Stem pubescent; leaves quinquefoliolate. At the outlet of valleys and in ravines in the environs of Valparaiso.

Linum aquilinum, Molin. (No. 10); compare L. Cummingii. The flowers yellow. On the barren upland, frequent from Valparaiso to the Cuesta de Prao mountain-ridge, beyond Coracovi.

Tropæolum brachyceras, Hook.? (No. 1). "Ravines near Valparaiso," Brackenridge.

Oxalis (No. 22). The root bulbous; the stem and its single terminal flower appearing before the leaves. Imparting a golden yellow hue to tracts of the barren table-land back of Valparaiso.

——— carnosa? (No. 23). Succulent; and having an underground woody stem. Maritime; growing in clefts of rocks along the sea-coast.

Coriaria (No. 2). Leaves tenderly herbaceous, cordate, entire; flowers icosandrous, and five or six styles. On the "sands of the sea-shore," Brackenridge.

(Villaresia? No. 1; gen.) near Ilex. A shrub, with prickly leaves. A single stock, growing about ten miles South of Valparaiso.

(———? No. 2; perhaps not distinct from the preceding); compare Ruizia of some writers. A tree thirty feet high, with the trunk a foot in diameter; leaves coriaceous, broad-ovate, entire. In ravines of the elevated mountain-ridge, that commences twelve miles South of Valparaiso.

Maytenus Chilensis, (No. 1). A very graceful tree, twenty to twenty-five feet high, with slender pendent branchlets, somewhat like those of the weeping willow, but for the distichous spreading leaves; capsule two-valved, containing two seeds. Growing on the table-land, from Valparaiso to Coracovi, and beyond.

Vitis vinifera, (bis Europe, mountains of Yemen, Australia, Austral Africa, Rio Janeiro, and the United States); the grape. Cultivated, chiefly for the table; but producing raisins of good quality, and a kind of wine by many approved.

———? (No. 2). A low shrub; leaves large, broad-ovate, obtuse, crenately dentate, glaucous beneath; capsule large, red, four-valved. To the Northward of Valparaiso.

Condalia? (No. 3); compare North Patagonia. A shrub, six feet high, having the habit of Ligustrum; leaves oblong, obtuse; berry one-seeded. From the mountain-ridge beyond Casa Blanca to Santiago, and beyond.

Colletia (No. 1). Leafless, but full of green spines; the flowers solitary, or in pairs. Frequent on the barren upland, in the environs of Valparaiso, and elsewhere.

———; perhaps not distinct from No. 1. Leaves attenuate at base; the fruit hairy. In the environs of Valparaiso.

——— (No. 2). Leaves broad at base, round-ovate; the flowers clustered. On the basal portion of the Andes.

———? (No. 3); compare Retanilla obcordata of Dec. Opposite spines; leaves pubescent, entire, obtuse. Towards the Middle mountain-region of the Andes.

(Lithræa) caustica, (No. 1); Rhus? of Hook. The fruit compressed, but not fleshy. A shrub, six to twelve feet high; the leaves oblong, entire, obtuse, resembling those of Rhus cotinus, and entirely smooth. Frequent on the basal portion of the Andes; where contact with it brought on the same sort of cutaneous eruption I have experienced from our R. venenata.

———; perhaps a second species. Pubescent; compare Mauria simplicifolia of Kunth. Frequent in the environs of Valparaiso.

Duvaua? (No. 1). A large shrub; strong-scented; the leaves simple and dentate; calyx 4-fid; petals four; stamens eight; berry one-seeded. Environs of Valparaiso, and elsewhere.

———?; perhaps not distinct from the preceding, but the twigs pubescent. A large shrub, or from the size of the trunk, a low tree; at Villa la Mar, seen twenty feet high with the trunk three feet in diameter. Environs of Valparaiso, and elsewhere.

Lupinus microcarpus? (No. 25); see Sims, 2413. Environs of Valparaiso.

(Hosackia? No. 15; compare) Lotus subpinnatus of Lagasca. Mountain-ravines to the Southward of Valparaiso.

Psoralea glandulosa, (No. 12). A shrub, six to ten feet high. Environs of Valparaiso; frequent at the outlet of valleys, near the level of the sea.

Coursetia? (No. 1). Suffruticose, upright, five to six feet high; leaflets in nine pairs; pod two-seeded. In mountain ravines in the neighborhood of Valparaiso.

———?; perhaps distinct from the preceding. Smooth.

———? (No. 2). Lanate; flowers and fruit not seen. Maritime; growing on the sands of the sea-shore.

Astragalus (No. 17; perhaps a congener of our Phaca villosa). Procumbent; the leaflets obcordate, or at least very obtuse; no signs of flowers or fruit. Found by Mr. Brackenridge.

———? (No. 18; perhaps a congener of our Phaca villosa). Procumbent, tomentose. From Coracovi to the Andes.

Geranium. Compare G. diffusum; but the flowers purple. The stem sometimes scandent or subscandent; the flowers small. From Valparaiso to the Andes. (According to Gray, in his published Volume, shown by the specimen to be G. dissectum of Europe).

Vicia nigricans, Hook.? (No. 5). Scandent, twelve to fifteen feet long; leaves terminating in a tendril; the leaflets about eleven, or in five to six pairs. South of Valparaiso, on the road to the Lagunillas.

Lathyrus sessiliflorus, Hook. (No. 11); near L. Magellanicus. Leaflets linear-lanceolate, unijugis; stipules large. In mountain-ravines back of Valparaiso.

Adesmia microphylla, Hook. (No. 3). A shrub, three to five feet high. Submaritime; frequent on the hilly ground along the sea-coast.

———; perhaps a second species. The leaves narrower. On the mountain-ridge between Casa Blanca and Coracovi.

———? (No. 4). A shrub, three to six feet high; devoid of spines; very viscous; pod of a single joint, reticulate, devoid of setæ. Environs of Valparaiso.—(Apparently the same plant, described in my Rough Notes as) Viscous, the leaves abruptly-pinnate?, the leaflets in eight pairs, and an Aeschynomene pod, but one-seeded.

Sophora macrocarpa, Smith; (No. 3) An ornamental shrub, having large yellow flowers. In two or three localities in the environs of Valparaiso.

Cassia (No. 25); near C. frondosa. An arborescent shrub, once seen fifteen feet high with the trunk six inches in diameter; large yellow flowers. Environs of Valparaiso, growing at the outlet of valleys near the level of the sea.

Gen. Cassia-like (No. 1). Having stipules; leaves pinnate; the leaflets large, ovate, in four pairs; pod as in Cassia, but entirely flat. "North of Valparaiso," Brackenridge.

(Vachellia) cavenia, (No. 2). An Acacia-like shrub, having the habit of V. farnesiana; the pod inflated, and rigid. Frequent in the Interior; becoming the prevailing shrub towards Santiago and on the basal portion of the Andes.

Acæna (No. 4); sericeous. Frequent on the heights or mountain-slope back of Valparaiso.

Margyrocarpus (setosus; compare No. 1 North Patagonia). Frequent on the barren ridges of the mountain-slope back of Valparaiso.

Gen. Rosac? (No. 1). A shrub, having the habit of Polygonum; leaves fasciculate, succulent, linear, not spinescent. On the road to Santiago.

Kageneckia oblonga, Ruiz & Pav. (No. 1). An arborescent shrub, six to twenty feet high. Frequent in the environs of Valparaiso; and especially abounding in the ravines of the basal portion of the Andes. (This, and the following plant, have the aspect of the Pomaceæ, except that in place of apples they bear only cores).

Quillaia smegmadermos, (No. 1). Usually an arborescent shrub; but on a depressed plain at the Western base of the Cuesta de Prao mountain-ridge, becoming a tree sixty feet high with the trunk three feet in diameter. Frequent all over the country; and especially abounding in the ravines of the basal portion of the Andes, as high as the commencement of the Middle mountain-region.

Lythrum (No. 5; compare Peru, and No. 1 Hawaiian Islands). Near L. lineare. In wet places, and on the exsiccated portions of river-beds; frequent.

Erodium (compare Lapwai in Interior Oregon, San Francisco in California), and E. millefolium. Two to three inches high. Frequent towards the Middle mountain-region of the Andes.

Juglans regia, (bis Australia, Europe, and the United States). Walnuts for sale in the market.

(Boldoa fragrans; No. 1); the boldo. A large shrub, somewhat Calycanthus-like; aromatic; the leaves Cordia-like, but opposite; calycifloral; the flowers white; petals about five; stamens about twenty; the fruit not seen. Frequent from Valparaiso to the basal portion of the Andes.

(Luma No. 1; nov. gen. of Gray). Myrtus-like; leaves broad, the under surface white; calyx four-cleft. From Valparaiso to Coracovi; frequent.

(——— No. 2); Myrtus-like. The leaves small, half an inch in length, lanceolate-ovate, green on both surfaces.

(——— No. 3); Myrtus-like. An arborescent shrub, six to twenty feet high; leaves broad, smooth, apiculate; berries in pairs, black, no bracts at the base; the calyx four-cleft. On the summit of the mountain-ridge that commences twelve miles South of Valparaiso.

(———) Leptospermoides? (No. 4); Eugenia of authors. Branches ferruginous; leaves small, lanceolate, obtuse; fruit solitary, short-pedicelled, granular when dried. Ravines in the environs of Valparaiso.

(——— No. 5); Eugenia-like. A shrub, having much of the aspect of the Australian species of Metrosideros; leaves lanceolate-linear; the young calyx clove-shaped; fruit bibracteate. River-banks in the environs of Valparaiso.

(———) chekan? (No. 6); Eugenia of authors. A tree, thirty feet high, with the trunk two feet in diameter; leaves ovate, obtuse, revolute or concave beneath; fruit bibracteate. On the summit of the mountain-ridge that commences twelve miles South of Valparaiso.

(——— No. 7); Eugenia-like. A shrub; the berries small, red, bibracteate. Environs of Valparaiso.

Jussiæa (No. 11); five petals. Aquatic; and rather frequent.

———? (No. 12). Pratia-like; the leaves spatulate, narrow, obtuse; five unequal calyx-teeth; petals not seen. Submaritime; growing "fourteen miles South of Valparaiso," Brackenridge.

Oenothera acaulis, Cav. (No. 13). Leaves laciniate; flowers rose, having a long tube; capsule 4-alate. "Hills North of Valparaiso," Brackenridge.

——— mollissima? (No. 14). Two feet high; softly-pubescent; the leaves linear, and mostly radical. Environs of Santiago.

——— tenella, Cav.? (No. 15). Annual. From Valparaiso to the base of the Andes.

——— (No. 16). Leaves broad, dentate. On exposed portions of the river-bed (at Villa la Mar, six miles) North of Valparaiso.

Godetia (No. 5). Flowers purple, large. Six miles North of Valparaiso; rare.

Epilobium (No. 20); near E. denticulatum of Ruiz & Pavon; but the leaves broad. Environs of Valparaiso, and elsewhere.

Fuchsia rosea, Ruiz & Pav. (No. 3); F. lycioides of Sims. A shrub; the flowers making their appearance before the leaves, and quite small when growing in barren soil. Environs of Valparaiso; rather frequent.

——— macrostemma, Ruiz & Pav. (No. 4). In the mountain-ravines back of Valparaiso; somewhat rare.

Melilotus parviflora, Desf.? (compare California, and North Patagonia). Humble. Environs of Valparaiso; probably introduced.

Myriophyllum (compare No. 2 Western Oregon, North California), and M. verticillatum. The flowers and fruit not seen. Aquatic; growing in the environs of Valparaiso, and elsewhere.

Callitriche (compare No. 1 New Zealand, and No. 2 California and our Atlantic States). Aquatic.

Carica? (No. 2). A milky-shrub, the leaves Jatropha-like; flowers dioecious?, tubular, with scales at the base; the long tube or true calyx five-cleft, with petals as in Fuchsia; follicle containing six seeds enveloped in pulp. Vicinity of "Valparaiso," Brackenridge.

Loasa? (No. 1). Mentzelioid; procumbent; flowers large, yellow, with the base of the petals red. In a ravine two miles to the Southward of Valparaiso.

——— (No. 2). Leaves very large, lobed, and the lobes obtuse; flowers not seen. In wet ground, ten miles South of Valparaiso.

Calandrinia glauca, Dec.? (No. 1); but the stem three feet. Leaves ovate, acute; flowers large, reddish-purple. Maritime; growing on rocky cliffs facing the sea.

Corrigiola? (No. 1). Polygonum habit; root fleshy, long, and fusiform; stems decumbent; leaves linear, upright. Maritime; growing on the sands of the sea-shore.

Acanthonychia ramosissima, (No. 1); gen. Paronych. Frequent in the environs of Valparaiso, growing on the barren upland.

Balardia? (No. 1); compare B. Platensis of St. Hil.; gen. Paronychia-like. Leaves short, filiform. Rare.

Mesembryanthemum (compare No. 1 New Zealand, Australia, and California). The leaves acinaciform. Maritime; growing on rocky cliffs facing the sea.

Tetragonia crystallina? (No. 2). In drying, the leaves become hoary, and the capsule manifestly cornuted. Maritime; growing on the sands of the sea-shore.

"Echinocactus" (No. 1). Depressed; the thorns large; the flowers not seen. Environs of Valparaiso.

"———" (No. 2); a foot high. The flowers small, red. Hilly ground along the sea-coast?.

"Cereus" (No. 7); near C. Peruvianus, but the stem having fourteen or fifteen angles. Columnar, six to twenty feet high, with upright branches. Frequent and conspicuous, from Valparaiso to the basal portion of the Andes.

Opuntia (No. 9). Normal; the stem-joints compressed. Observed only in the vicinity of Valparaiso; perhaps not indigenous.

Ribes (No. 11). Smoothish; the leaves glandular-punctate; flowers and fruit not seen. Mountain-ravines back of Valparaiso.

——— glandulosum, Ruiz & Pav.? (No. 12). Entirely pubescent; leaves glandular-punctate; flowers not seen. Twelve miles South of Valparaiso.

——— (No. 13). Softly pubescent. Towards the Middle mountain-region of the Andes.

Escallonia rubra, (No. 2). Flowers sparse, in simple racemes, bright-red. Mountain-ravines back of Valparaiso.

Cydonia vulgaris, (bis Yemen, Australia, Rio Janeiro, the United States, and No. 1 Europe). Quinces for sale in the market.

Pyrus communis, (bis Persian Gulf, Australia, St. Helena, Rio Janeiro, the United States, and No. 1 Europe). Pears for sale in the market.

Malus sylvestris, (bis Yemen, Australia, Rio Janeiro, the United States, and No. 1 Europe). Apples for sale in the market, but of inferior quality.

——— sp. of Dec. (No. 3). A shrub, six to eight feet high; flowers densely-panicled, white. On the river-bank (six miles) North of Valparaiso, C. P.

——— (No. 4). A shrub or small tree; viscous; the capsule large. Ravines towards the Middle mountain-region of the Andes.

——— (No. 5). A shrub or small tree; leaves smooth, glaucous beneath. Ravines towards the Middle mountain-region of the Andes.

——— (No. 6). Entirely pubescent; leaves argutely-serrate. Environs of Valparaiso.

——— (No. 7). Leaves viscous, narrow, entirish. Environs of Valparaiso.

——— (No. 8). A shrub, four to six feet high; leaves minutely reticulate, grey on both sides. Between Casa Blanca and Coracovi.

——— (No. 9). Leaves smooth, argutely-serrate. Environs of Santiago.

——— (No. 10). A shrub, six to twelve feet high; viscous; leaves minutely reticulate, in some instances pubescent beneath. Frequent in the environs of Valparaiso.

Hydrocotyle batrachioides, Dec. (No. 19); near H. ranunculoides. Subaquatic; abounding in wet places around springs.

——— (No. 20). Leaves peltate, orbicular, entirish; umbels capitate, with the peduncle shorter than the petioles. Subaquatic; abounding in wet places around springs, from Valparaiso to the Middle mountain-region of the Andes.

Fragrosa spinosa, Ruiz & Pav.? (No. 2; perhaps a distinct genus). Leaves cuneate, 5-dentate; the flowers and fruit not seen. Growing on the summit of the mountain-slope back of Valparaiso, where the table-land commences.

Asteriscium Chilense, (No. 1). Stem naked; the lower leaves much divided. Submaritime; growing chiefly on the sands of the sea-shore, but observed also on the mountain-slope back of Valparaiso.

Eryngium paniculatum? (No. 7). The tuft of radical leaves, before the stem makes its appearance, much resembling a young Pandanus. Frequent in the environs of Valparaiso; the isolated stocks conspicuous on the barren upland.

Apium (agreeing in habit with No. 1 New Zealand, Australia, and North Patagonia); the stems strong-flavored. Maritime; growing on rocks along the sea-coast.

——— (No. 3); the leaves more finely divided; the stem very long. In mountain-ravines back of Valparaiso.

Gunnera scabra, (No. 2); the pankeh. Rheum-leaved. At the outlet of valleys, near the level of the sea.

(Struthanthus? No. 1). Viscum-like; the stem rough; leaves alternate, roundish-cordate; fructification terminal. Parasitic on trees on the summit of the mountain-ridge twelve miles South of Valparaiso; not seen elsewhere.

Loranthus tetrandrus, (No. 16). Having showy scarlet flowers. Parasitic, chiefly on Colliquaja bushes; and frequent from Valparaiso to the Andes.

——— aphyllus, Dec. (No. 17). The flowers scarlet and showy. Parasitic on the columnar Cereus, from the Cuesta de Prao mountain-ridge to the Andes.

Amygdalus Persica, (bis Hawaiian Islands, New Zealand, Rio Janeiro, Europe, and the United States). The peaches of Chili are celebrated, but to our party they seemed inferior to those of New Jersey.

Cucurbita pepo, (bis Taheiti, No. 1 Peru, and the United States). Pumpkins for sale in the market. (The plant probably brought from the Northward by aboriginal settlers).

Galium ericoides? (No. 21). The leaves verticillate in fours. From Valparaiso to Coracovi.

——— (No. 22); compare G. Tarmense of Hooker. Stem smoothish; leaves narrow, pointed, verticillate in fours; fruit slightly pilose. In the environs of Valparaiso, and also of Santiago.

——— (No. 23). The fruit slightly granulate. Environs of Valparaiso.

Rubia relbum, (No. 3). The fruit orange-colored. Frequent in the environs of Valparaiso.

Macrorhynchus? (No. 1); gen. Cichor. Tall; the radical leaves runcinate. Environs of Valparaiso.

Mutisia ilicifolia? (No. 2). Stem alate; leaves amplexicaul; flowers, according to Mr. Brackenridge, "yellow." Mountain-ravines back of Valparaiso.

——— inflexa, (No. 3). Frequent from Valparaiso to the Middle mountain-region of the Andes.

Piptocarpha excelsa, Hook.; (No. 1). A tree, forty feet high with the trunk two feet in diameter, the branches not spreading but densely coarctate; the flowers clustered. On the elevated mountain-ridge, that commences twelve miles South of Valparaiso.

Pentaphorus? (No. 1). A shrub, three to six feet high, rigid, the branches inclining to become spinescent; leaves attenuate; flowers clustered. From Santiago to the Middle mountain-region of the Andes.

———? (No. 2); perhaps distinct from the preceding. Frequent in the environs of Valparaiso.

Proustia pyrifolia, (No. 1). A subscandent shrub; the leaves entire, downy beneath. On the heights or mountain-slope back of Valparaiso.

——— baccharoides, Don; (No. 2). Leaves lanceolate, dentate, the under surface white; flowers panicled. On barren hills in the environs of Santiago; rare.

——— (No. 3). A large shrub; leaves large, with the margin minutely spinuloso-serrate. Frequent in the environs of Valparaiso.

(Chætanthera? No. 1); gen. Compos. Having something of the habit of Eriogonum; the leaves incano-tomentose; flowers red. On the "road to Santiago," Brackenridge.

Gen. Compos. (No. 1). Root woody; leaves linear; flowers yellow, with scarious calyx-scales. Frequent from Valparaiso to the Andes.

Chevreulia? (No. 1). Old, and past flowering; leaves Gnaphalium-like, and very soft; pedunc. naked. Maritime; growing on the sands of the sea-shore, North of Valparaiso.

Triptilion (No. 1). Annual; leaves prickly; the flowers showy and sapphirine. Said to be "frequent on the hills at Valparaiso immediately after the rainy season:" at the time of our visit, not a vestige was visible. (The specimen presented to the Expedition.)

Polyachyrus (No. 1). Stem long, and herbaceous; leaves Mutisia-like, amplexicaul, runcinate. "Maritime," Brackenridge.

Foeniculum vulgare, (bis No. 1 Italy, Hawaiian Islands, &c.); fennel. Naturalized; growing around houses.

Daucus carota? (bis Hawaiian mountain-region, New Zealand, Australia, North Patagonia, the United States, and No. 1 Europe); compare also D. Australis of Poeppig. Naturalized; and the root not fleshy.

Centaurea Chilensis, Bert.? (No. 7). Environs of Santiago.

Eupatorium salvia, Dec. (No. 17); E. reticulatum of Hooker. A shrub. Frequent on the heights or mountain-slope back of Valparaiso.

——— glechonophyllum, Dec. ? (No. 18). Herbaceous. Growing in mountain-ravines back of Valparaiso.

(Nothites baccharidea? No. 1); gen. Conyzoid?. Having the habit of Solidago; leaves broad, dentate; panicle upright; flowers white; no floret-rays. Frequent in the environs of Valparaiso.

Tripolium conspicuum, Dec. ? (No. 10); but very inconspicuous. Much resembling T. subulatum, but devoid of floret-rays. On exsiccated portions of the river-bed of the Maipu, at Santiago.—Congeneric with a plant brought from Surinam.

Noticastrum adscendens, Dec. (No. 1). Flowers or floret-rays varying in color from dark purple to white. Frequent from Valparaiso to the Andes.

Gen. Asterid? (No. 1). Old, and past flowering; no leaves. Environs of Santiago.

(Cænotus) spiculosus, (No. 9); Erigeron of Hooker, compare also E. hirtellum of Dec. Much like C. Canadensis. Frequent in the environs of Valparaiso.

Solidago linearifolia, Dec. ? (No. 24); the leaves in some instances serrate. From Valparaiso to the Middle mountain-region of the Andes.

Brachyris? (No. 2); compare Guttiereza linearifolia of Lag. The flowers terminal. Environs of "Valparaiso," Brackenridge.

Aplopappus foliosus, Dec. (No. 1). The flower sessile, viscous, large. Along the coast North of Valparaiso, and at "Villa la Mar," Brackenridge.

——— (No. 2). The leaves oblanceolate, dentate. Environs of Valparaiso.

——— inuloides, Hook. (No. 3). The leaves narrow, acute; flowers pale-yellow, the calyx-scales acute. Environs of Valparaiso.

——— (No. 4). The stem bearing reticulate, obovate, dentate leaves; and two or three flowers. Environs of Valparaiso.

——— (No. 5). The flowers peduncled, large; the calyx-scales very numerous. On the road to Santiago.

Conyza diversifolia, Dec. ? (No. 6). The leaves dentate. On exsiccated portions of the river-bed of the Maipu, at Santiago.

——— linearis, Dec. ? (No. 7). The leaves filiform. Environs of Santiago.

Baccharis concava, Ruiz. & Pav. (No. 14). The flowers clustered. Frequent in the environs of Valparaiso.

———? Pingræa, Dec. (No. 15). Willow-leaved, and having corymbose terminal flowers. On the exsiccated sandy portions of river-beds, at Valparaiso, Coracovi, and elsewhere.

———? chilquilla Dec. ? (No. 16). Having the habit of the preceding, but the leaves with coarser dentures, and incano-tomentose beneath. On exsiccated portions of the river-bed of the Maipu, at Santiago.

——— rosmarinifolia, Hook. (No. 17). Frequent in the environs of Valparaiso.

Tagetes glandulifera, Dec. (No. 1). The leaves pinnate, ciliate. In waste ground in the outskirts of Santiago.

Madia sativa, (compare California). Frequent in the environs of Valparaiso and Santiago, and in other localities; seemingly indigenous.

——— possibly a second species; the flowers smaller.

——— sagittalis, Dec. (No. 18). A finer species than No. 8 Brazil; five feet high, the stem trialate. Hills beyond Villa la Mar, North of Valparaiso.

——— (No. 19); leaves short, linear; the flowers scattered. Environs of Valparaiso.

——— (No. 20); leaves linear, obtuse; flowers clustered, the pappus very long. On the Cuesta de Prao mountain-ridge, between Coracovi and Santiago.

——— (No. 21). One to two feet high; leaves succulent, cuneate; the flowers solitary. Maritime; growing on the sands of the sea-shore.

——— (No. 22); branches furfuraceous; the flowers solitary. Environs of Valparaiso.

Gnaphalium (No. 41; compare Micropsis). Dwarf. On the road to Santiago.

——— (No. 42); habit of Micropus. Incano-tomentose. Vicinity of "Santiago," Brackenridge.

——— (No. 43). The leaves undulate, crisped. Submaritime.

——— (No. 44). The leaves decurrent. In the environs of Santiago, and elsewhere.

——— (No. 45); large lanceolate leaves; four inches. Environs of Valparaiso.

——— (No. 46); intermediate. On the road to Santiago.

——— (No. 47). The leaves green.

——— (No. 48). Lanate and white, very downy. Maritime; growing on the sands of the sea-shore.

———? (No. 49); leaves lanceolate-linear, crisped; the flowers very small. Growing in wet places.

Senecio (No. 25). Five feet high, and much-branched; the leaves pinnatifid. On exsiccated sandy portions of river-beds, North of Valparaiso, and elsewhere.

——— (No. 26); large, lanceolate, Rumex-like leaves; and large yellow flowers. On exsiccated portions of the river-bed of the Maipu, at Santiago.

———? (No. 27); leaves succulent, obtuse, trifid at the apex. Maritime; growing on rocks along the sea-coast.

———? (No. 28); leaves viscous, succulent, broad, dentate. Maritime; growing on rocks along the sea-coast.

———? (No. 29). Environs of Santiago.

(Bahia ambrosioides? No. 4). Hymenopappus-like; habit of Parthenium hysterophorum; leaves multifid; the pappus-rays scale-like. Environs of Valparaiso.

Cephalophora glauca, (No. 1); but all the leaves entire. The radical leaves lanceolate, obtuse. From Valparaiso to the Andes.

Galinsoga parviflora? (No. 1). On exsiccated portions of the river-bed at Lagunillas, South of Valparaiso.

Flourensia thurifera, (No. 1); Helianthus of Hooker. A shrub, four to six feet high; having large yellow flowers. Frequent in the environs of Valparaiso.

Euxenia mitiqui, (No. 1). A shrub, four to five feet high. Frequent in the environs of Valparaiso.

Bidens leucantha? (No. 13; compare Polynesian Islands and California). The flowers white. Environs of Valparaiso.

Xanthium spinosum, (bis North Patagonia and our Atlantic States). Extremely abundant in the outskirts of Valparaiso; growing as a weed, and clearly introduced. No specimens.

Olea Europæa, (bis Mediterranean Countries and Hindostan); the olive. Successfully cultivated; trees bearing fruit seen at Santiago.

Lobelia polyphylla, Hook. (No. 52). A thick-stemmed shrub, four to eight feet high; leaves linear-lanceolate; long scarlet flowers. Frequent on the heights or mountain-slope back of Valparaiso.

——— (No. 53). A shrub; the leaves broader and more distinctly dentate; the flowers shorter, purple. Environs of Valparaiso.

Wahlenbergia linarioides, Lam. (No. 4). From Valparaiso to the base of the Andes.

Gen. Anagallid. (alternifolia, No. 2); Anagallis of Cav. A congener of No. 1 Terra del Fuego; the flowers larger and whitish. Frequent in wet ground around springs, in the environs of Valparaiso and elsewhere.

Samolus Valerandi? (compare No. 1 United States, Brazil, and North Patagonia). Submaritime, growing in "salt-marshes," Brackenridge.

(Lucuma Valparadisica, No. 1); Chrysophyllum-like. In the deep mountain-ravine facing the sea, three miles South of Valparaiso.

(Oxypetalum Hookeri? No. 1); Cynanchum birostratum of Hook. ?. A vine; smooth; the leaves ovate, subsessile; the flowers yellow. On the heights or mountain-slope back of Valparaiso.

(——— confertiflorum? No. 2). A herbaceous vine; the leaves sagittate; the follicle Asclepias-like. Maritime; growing on the sands of the sea-shore.

Eccremocarpus scaber, (No. 1). An ornamental vine. On the basal portion of the Andes.

Aldea (No. 2; compare No. 1 Western Oregon, Interior Oregon, and North California). From Valparaiso to the Middle mountain-region of the Andes, and beyond.

Dichondra (compare No. 1 New Zealand); sericeous. Frequent on the ridges of the mountain-slope back of Valparaiso.

——— (No. 3). The leaves green. Frequent on the ridges of the mountain-slope back of Valparaiso.

Cuscuta Chilensis, Ker. (No. 6). Frequent in the environs of Valparaiso.

Gen. Nolanac. (No. 1). Leaves thickened and succulent, ovate, entire, petioled; calyx large, five-cleft; carpels numerous; the corolla not seen. Maritime; growing on the sands of the sea-shore at Lagunillas; rare.

Nov. Gen. Nolan. (No. 1). Stems procumbent; leaves crowded, succulent, cylindrical, pointed; flowers yellow. Maritime; growing on rocks along the sea-coast.

Cestrum parqui, (No. 4). A many-stemmed shrub, two to six feet high. Abounding at the outlet of valleys near the level of the sea.

Nicotiana acuminata, (No. 5); see Botan. Magazine. Growing in the vicinity of Coracovi, and elsewhere.

Physalis Peruviana? (No. 7). Pubescent; the leaves entirish; corolla yellow, with a spot at base. Valley Northeast of Valparaiso, C. P.

Solanum (No. 54); resembling S. nigrum, but the flowers large. Frequent in the environs of Valparaiso, and elsewhere.

Convolvulus althæoides, (bis Australia, and No. 11 Malta and Italy). Growing in the outskirts of Valparaiso; evidently introduced.

Solanum nigrum? (compare Hawaiian to the Feejee Islands, the Thebaid, and No. 28 California). Environs of Valparaiso.

——— tuberosum, (bis Singapore, Hindostan, Zanzibar, New Zealand, United States, and No. 56 Peru). Potatoes for sale in the market.

——— (No. 55). Somewhat ornamental; four to eight feet high; leaves linear-lanceolate; flowers blue. Abundant in the vicinity of Coracovi.

Lycium (No. 7). Spiny; the leaves small. Barren hills in the environs of Santiago; rare.

———; perhaps distinct. Pubescent, and devoid of spines. On the "rocks of the sea-coast," Brackenridge.

Calceolaria integrifolia, (No. 1). A shrub, two to four feet high. Frequent on the heights or mountain-slope back of Valparaiso.

——— (No. 2); leaves long, the surface much reticulated. On the "road to Santiago," Brackenridge.

——— (No. 3); the flowers large. Vicinity of "Coracovi," Brackenridge.

——— (No. 4); pubescent. Environs of Valparaiso.

——— (No. 5); herbaceous. Mountain-ravines back of Valparaiso.

——— (No. 6); herbaceous; all the leaves pinnatisect. In deep mountain-ravines, back of Valparaiso, and also twelve miles South.

——— (No. 7); perhaps not distinct from No. 6. The leaves Hydrophyllum-like, pinnatilobed.

Alonsoa incisifolia, Ruiz. & Pav.? (No. 1). Frequent at the outlet of valleys near the level of the sea.

Mimulus parviflorus, Lindl.? (No. 13); the flowers small, yellow. Frequent in wet places near springs, in the environs of Valparaiso, and elsewhere.

——— rivalis? (No. 14); the flowers large, yellow, with a purple spot on the lip of the corolla. On exsiccated portions of the river-bed of the Maipu, at Santiago; rare.

Limosella tenuifolia? (compare No. 1 United States, and North Patagonia); leaves linear. Abounding in wet places near springs, in the environs of Valparaiso.

Buddleia (No. 3); capit. globose. Towards the Middle mountain-region of the Andes.

Gen. Rhinanthac. (No. 1). Habit of Salvia; a foot high; flowers large, blue. In wet places, from Valparaiso to the Andes.

Gen. Melampyrum-like (No. 1). Vicinity of "Coracovi," Brackenridge.

Gardoquia Gilliesii, Benth. (No. 1). A shrub, two to five feet high; flowers bluish-purple, but turning red in drying. Frequent on the ridges of the mountain-slope back of Valparaiso.

Stachys (No. 6); normal. On the heights or mountain-slope back of Valparaiso, clearly indigenous.

———? (No. 7); or compare Sphacele. Softly pubescent; the calyx-teeth pointed. Environs of Valparaiso.

Sphacele Lindleyi, Benth. (No. 1). A large shrub, four to nine feet high. Frequent on the ridges of the mountain-slope back of Valparaiso.

——— campanulata? (No. 2). Environs of Valparaiso?.

Teucrium bicolor, Smith; (No. 4); see Bentham, 668. A many-stemmed shrub, three to six feet high. Frequent on the ridges of the mountain-slope back of Valparaiso.

Datura (compare Peru); perhaps distinct from D. stramonium; the spines of the capsule few and large. Seemingly indigenous on the sands of the sea-shore, (but perhaps brought from the Northward by aboriginal settlers).

Mentha (compare M. viridis); whorls of flowers crowded towards the summit of the stem. From Valparaiso to Santiago; seemingly indigenous.

Gen. Labiat. (No. 1). Leaves reniform, the under surface white. Environs of Valparaiso.

Zapania (compare No. 1 California, and North Patagonia). Leaves sparsely serrate. Rare.

Verbena (No. 12); like V. officinalis. Leaves three-parted. Environs of Valparaiso.

——— (No. 13); leaves divided, small. Environs of Valparaiso.

——— (No. 14). Upright; leaves coarsely dentate; spikes slender.

——— (No. 15); long bracts. On exsiccated portions of the river-bed of the Maipu, at Santiago.

Pœppigia cyanocarpa, (No. 1); Citharexylon of H. A shrub, four to eight feet high, ornamental from the blue color of its berries. On the summit of the mountain-ridge that commences twelve miles South of Valparaiso.

———, perhaps only the young state of the preceding; the leaves dentate. Growing in a ravine on the same mountain-ridge.

Ruellia dulcis, Cav.? (No. 12). Nearly stemless; the flowers of medium size, blue. On the barren upland back of Valparaiso; corresponding to and taking the place of the violets of the Northern Hemisphere.

Boerhaavia (No. 12); an inconspicuous species. From Valparaiso to the Middle mountain-region of the Andes.

Plantago (No. 30); leaves ovate, tenderly herbaceous. Frequent in wet places in the environs of Valparaiso.

——— (No. 31); agreeing in habit with the preceding, but pubescent or hairy.

——— hispidula, Ruiz. & Pav. (No. 32). Annual; tall; the leaves filiform; the spike many-flowered.

——— (No. 33). Low; the leaves filiform; the scapes few-flowered; capsule large.

(Roubieva) multifida, (No. 1); Chenopodium of Linn. Seemingly indigenous.

Chenopodium (No. 10). Found by Mr. Brackenridge.

——— (No. 11). Found by Mr. Brackenridge.

Salsola (compare No. 1 Malta and our Atlantic States, and No. 3 Interior Oregon); like S. kali. Maritime; growing on the sands of the sea-shore.

(Helxine) tamnifolia, (No. 10). Not climbing, but the numerous stems forming tangled masses that have the outline of the surrounding many-stemmed shrubs. Frequent from Valparaiso to the Andes.

Polygonum maritimum? (compare No. 6 Egypt, Western Oregon, North California, and our Atlantic coast). Maritime; growing on the sands of the sea-shore.

——— (No. 30); habit of the preceding species. Growing in the vicinity of Santiago.

——— (compare Taheiti, Hawaiian Islands, No. 4 New Zealand and Australia, and No. 16 Sacramento river in California); like P. mite. Subaquatic; growing in the river-bed of the Maipu above Santiago, and clearly indigenous.

Rumex (No. 19); often many-crowned. On exsiccated sandy portions of the river-bed at Villa la Mar, North of Valparaiso.

———; leaves small. From Valparaiso to Santiago; seemingly indigenous.

Stachys; compare S. Germanica. Woolly. On the road to Santiago; probably introduced.

Plantago major? (compare New Zealand, Western Oregon, our Atlantic States, and No. 14 Austria); but very tall, and the leaves upright. On exposed portions of the river-bed of the Maipu, at Santiago.

Peumus (No. 1). Usually an arborescent shrub, or a small tree not exceeding thirty feet in height; but on the plain at the Western base of the Cuesta de Prao mountain-ridge, fifty feet high with the trunk two feet in diameter. Leaves reticulate, entire, and mostly opposite; the drupe one-seeded, and crowned with the six sepals and stamens. Frequent from Valparaiso to the Andes; and the fruit, in large quantities for sale in the market.

Laurus (No. 16). A shrub, five feet high; leaves penninerved, Alnus-like, the margin entire. On the mountain-ridge between Casa Blanca and Coracovi.

Quinchamalium Chilense, (No. 1). Herbaceous, and humble. Growing on the barren upland from Valparaiso to the Middle mountain-region of the Andes.

Elæagnus? (No. 2). A tree, forty feet high, with the trunk eighteen inches in diameter. In ravines of the mountain-ridge that commences twelve miles South of Valparaiso.

Aristolochia (No. 9). A short-stemmed vine; leaves broad reniform; flowers large, dark-colored, an inch and a half long. Submaritime; growing on hilly ground near the sea-coast, North of Valparaiso.

Euphorbia (compare No. 44 United States, and North Patagonia); like E. maculata. Appressed to the ground. Between Coracovi and Santiago.

——— (No. 46). Eight inches high; leaves obovate, entire. Environs of Valparaiso; and apparently the same species, towards the Middle mountain-region of the Andes.

Colliquaja (No. 1). A shrub, three to five feet high; leaves mucronate, with the margin mucronately serrate. Frequent on the mountain-slope back of Valparaiso, and in other localities.

——— perhaps distinct. The leaves calloso-serrate, obtuse. Mountain-ravines back of Valparaiso.

Phyllanthus (No. 28); leaves bristly. "North of Valparaiso," Brackenridge.

Urtica (No. 23). Environs of Valparaiso; observed also on the road to Santiago, and in other localities. (Seemingly indigenous.)

Salix (compare No. 26 Rio Negro in Patagonia). On the exsiccated portions of river-beds at Villa la Mar, and elsewhere.

Gen. incert. (No. 1). A leafless shrub, six to eight feet high, having the habit of Ephedra; pubescent; fruit a globular nut, covered with a hard rind. Twelve miles South of Valparaiso; rare.

Ephedra (compare No. 1 North Patagonia). From Valparaiso to the Middle mountain-region of the Andes, and beyond.

Lemna gibba? (compare No. 4 California). Frond small, and while living, very gibbous or convex beneath. Intermingled with the next species in pools at Villa la Mar.

——— polyrhiza? (No. 5). Frond larger. Abounding in pools at Villa la Mar.

Spiranthes? (No. 5); compare Neott. diuretica; the flowers smaller than in Chloræa. On the summit of the mountain-slope back of Valparaiso, along the commencement of the table-land.

Chenopodium rubrum? (compare United States, Malta, Egypt, and No. 4 Western Oregon). Growing as a weed, and evidently introduced.

Amaranthus. Growing in waste ground and among rubbish, in the outskirts of Valparaiso; probably introduced.

Polygonum persicaria, (bis Lapwai in Interior Oregon, and our Atlantic States). Evidently introduced.

Sisyrinchium iridifolium, (No. 11). The leaves like those of Iris versicolor; the flowers yellow. In the environs of Valparaiso, and elsewhere.

——— (No. 12); narrow-leaved. Mountain-ravines back of Valparaiso. No specimens.

——— (No. 13); grass-leaved. Submaritime; growing on the sands of the sea-shore at Villa la Mar.

———? (No. 14). Small; grass-leaved; the bracts very broad. In mountain-ravines back of Valparaiso, C. P.

Amaryllis-like (No. 1). Nine inches high; the capsule very short. Vicinity of "Valparaiso," Brackenridge.

Conanthera (No. 1). The flower spotted, as in Moræa; capsule half-inferior. Eight miles South of Valparaiso, Rich.

Alstroemeria (No. 2); "like A. tricolor." Vicinity of "Valparaiso," Brackenridge.

Dioscorea (No. 13); fruit small, shining. Environs of Valparaiso.

——— (No. 14); fruit larger, and emarginate at the apex.

Bromelia? (No. 14); compare the puya of Molina. Decumbent, dichotomously branching from a central root; flower-stems twelve feet high. Frequent and conspicuous on the mountain-slope back of Valparaiso, a single plant sometimes covering an area fifty feet in diameter.

——— (No. 15); "a second species. Green. On the rocks of the sea-coast," Brackenridge.

——— (No. 16). Pulverulent; white; leaves having their marginal prickles turned towards the apex. Substituted for or replacing the coast species, on the Cuesta de Prao mountain-ridge, and beyond.

——— (No. 17). The flower-stem not projecting above the leaves. Forming beds on rocky cliffs facing the sea. Figured by Mr. Agate.

(Cocos Chilensis, Molin.? No. 2). A palm, thirty feet high, with the trunk four feet in diameter; fronds pinnate, fifteen feet long; the fruit said to "resemble a cocoa-nut in miniature." Seen only in the valley Northeast of Valparaiso, where about twenty scattered stocks were growing. Described as yielding a saccharine substance, resembling "honey, which is sold together with the nuts in the market."

Triglochin (compare No. 2 California, Western Oregon, and our Atlantic coast, and No. 4 Patagonia). Maritime; growing in wet places back of the sea-beach at Villa la Mar.

Carex (No. 84); like C. pseudocyperus. Cespitose; the leaves very long. In wet places beyond Casa Blanca.

———? (No. 85). The leaves very long; a terminal spike. In a "ravine" of the mountain-ridge that commences twelve miles South of Valparaiso, Rich.

Ficus carica, (bis Hindostan, the Mediterranean Countries, Brazil, and our Southern States). Figs of excellent quality abundant and cheap; but the dried fruit inferior.

Salix. A species planted for ornament.

Populus dilatata, Ait. (bis United States); the Lombardy poplar. Planted for ornament around Santiago; and in much more flourishing condition than in the climate of the United States.

Musa paradisica, (bis Polynesian Groups to the East Indies, Zanzibar, Egypt, and Brazil); the banana. Planted in the vicinity of Valparaiso, but not seen bearing fruit.

Zea mays, (bis Mindanao, Zanzibar, New Zealand, Australia, United States, and No. 1

Isolepis (No. 8). Cespitose; two to three inches high; a lateral spikelet. Frequent from Valparaiso to the Middle mountain-region of the Andes.

Scirpus (compare No. 1 Hawaiian Islands, Oregon, California, our Atlantic States, and Patagonia). Tall; like S. lacustris, but the stem distinctly trigonal. Submaritime?; growing in pools of brackish water back of the sea-beach.

——— (No. 21). Having the habit of Cyperus; leafy. Villa la Mar, and elsewhere.

Cyperus (No. 40); near C. dentatus. In wet places, from Valparaiso to the Andes.

Setaria (compare No. 5 Patagonia). Environs of Valparaiso; perhaps indigenous?

Nov. gen.? Gram. (No. 1); habit of Agrostis, but seems allied to Panicum. A long awn. Vicinity of "Santiago," Brackenridge.

Stipa (No. 17). Inconspicuous, and having small florets. Environs of Valparaiso, C. P.

Aristida (No. 19). The florets in a dense congested panicle. Observed on the road to Santiago and elsewhere.

——— (No. 20). Low, and cespitose. Environs of Valparaiso, rare, C. P.

Agrostis (No. 31); habit of Aristida. Environs of Valparaiso.

(Psamma?, compare No. 2 Patagonia). Gramin., agreeing with Psamma in the creeping roots deeply buried in the sands of the sea-shore; not seen in flower.

Deyeuxia? (No. 2). Tall, and reed-like; the leaves serrated, and inflicting severe wounds; florets white. In the deep mountain-ravine three miles South of Valparaiso.

Phragmites (compare No. 1 Italy, Oregon, California, our Atlantic States, and Patagonia). Environs of Valparaiso, and observed also at Santiago.

Melica (No. 4). Tall; the leaves numerous, involute, scabrous. Environs of "Valparaiso," Brackenridge.

Bromus (No. 9; compare Ceratochloa). Awned; the spikelets compressed. Environs of Valparaiso.

Chusquea quila, Molin. (No. 1). A kind of bamboo; the clusters resembling in outline those of Brazil, but only twelve feet or so high, except on the mountain-ridge that commences twelve miles South of Valparaiso; stem hard and solid; the flowers not seen. Frequent along streams in the vicinity of the coast; not seen as far inland as Santiago and the base of the Andes.

Andropogon (No. 32). The spikelets terminal, clustered. Submaritime?; growing in the vicinity of "Valparaiso," Brackenridge.

Equisetum (No. 8). Having the habit of E. scirpoides, but much larger, and the whorled branchlets longer. Frequent in wet places from Valparaiso to the Andes.

Peru). Cultivated fields of Indian corn observed at intervals; the stems used for building purposes, interwoven and plastered with clay. (The plant was probably brought from the Northward by aboriginal settlers.)

Polypogon Australe? (compare Patagonia, and No. 1 Europe). Frequent from Valparaiso to the Andes.

Avena sativa? (compare California, Patagonia, United States, Egypt, and No. 2 Europe); the oat. Abundant everywhere; and seemingly indigenous.

Eragrostis Mexicana? (No. 26; compare Patagonia). Growing in the vicinity of Santiago; probably introduced.

Lolium (compare Patagonia, United States, and Europe). Vicinity of Santiago, probably introduced.

——— (No. 9). Very tall; full eight feet high, with the stem proportionally large; the whorled branchlets more than a foot in length. On the river-bank of the Maipu at Santiago.

Azolla (bis No. 2 California, Brazil, and North Patagonia). Exceedingly abundant on the surface of all running streams, from Valparaiso to the Andes.

Polypodium (No. 54); pillabilcum of Feuillee. Epidendric on the trunks and branches of trees, on the mountain-ridge that commences twelve miles South of Valparaiso.

Cheilanthes (No. 12). Densely tomentose; the frond much divided. On the "rocks of the sea-coast North of Valparaiso," Brackenridge.

——— (No. 13); the frond narrower. More frequent; growing in clefts of rocks on the mountain-slope back of Valparaiso.

Adiantum Chilense? (No. 28). A foot high; smooth above, and the stipe smooth. Environs of Valparaiso.

——— (No. 29); apparently distinct; being hairy all over. Frequent in the environs of Valparaiso.

Blechnum hastatum, (No. 12). In mountain-ravines back of Valparaiso.

Lomaria (No. 11). Six feet high; the frond broad. In mountain-ravines back of Valparaiso.

Asplenium (No. 60). Frond small, only three or four inches high. In the deep mountain-ravine three miles South of Valparaiso; rare.

(Thelypteris? No. 16). Habit of Aspidium thelypteris, but much larger. Frequent in the environs of Valparaiso.

Aspidium (No. 35). Habit of Pteris aquilina. In the mountain-ravine three miles South of Valparaiso.

Gen. Dicksonia-like (No. 1). Stipes arising in a linear series from a root-like rhizoma?, creeping below the surface of the soil; the fructification not seen. Found by Mr. Rich in a ravine of the mountain-ridge that commences twelve miles South of Valparaiso.

Marchantia (No. 8). Frond small, and tenderly herbaceous. In mountain-ravines back of Valparaiso.

Hypnum (No. 24). In a ravine of the mountain-ridge that commences twelve miles South of Valparaiso.

Musci incerti. A few other mosses met with, but not critically examined.

Ramalina? (No. 7).

Borrera flavicans, (No. 4). Adhering to the stems and surface of the columnar Cereus.

——— furfuracea, (No. 5).

Usnea (No. 6).

Lichenes incerti. A few other Lichens met with, but not critically examined. An instance observed of living leaves overgrown with Lichens, as in moist Tropical woods.

Agaricus (No. 22).

Fungi incerti. A few other Fungi met with, but not critically examined.

NEGATIVE CHARACTERS. The following enumeration of negative features is applicable both to Lower Chili and the country beyond, as far as the snow on the Andes.

Ferns were seen only in the vicinity of Valparaiso and of the sea-coast; and were there confined to ravines, with the exception of some

small species in the clefts of precipitous rocks.—Diminutive Cryptogamic plants, as *Hepaticæ* and *Mosses*, were in like manner rare, and confined almost entirely to ravines and wet places; though it is true, these tribes were particularly sought for only around the melting snow on the Andes.—*Lichens* were also rare: a Boldoa shrub having some of its leaves overgrown with Lichens, presenting an instance of the long duration of *foliage* in the Chilian climate.—*Fungi* too seemed rare.

Amentaceæ, unlike the state of things further South in Terra del Fuego, were rare; consisting only of a species of *Salix* or willow, growing on the exposed portions of river-beds.—*Coniferæ* were absent, with the exception of an *Ephedra*.—*Rubiaceæ*, the tribe *Stellatæ* excepted, were also absent.—*Juncaceæ* were represented only by an Alpine species growing near the snow.—*Orchidaceæ*, by only an inconspicuous species growing near the coast.—*Malvaceæ* were rare.—As also *Cyperaceæ*.—*Primulaceæ* were represented only by *Samolus* and *gen. Anagalloid*, both confined to the vicinity of the sea-coast.

Independent of Tropical Families which it seemed unnecessary to specify, the following tribes of plants were not met with:

Anonaceæ,	Crassulaceæ,	(Coniferæ proper),
Nymphæaceæ,	Saxifrageæ proper,	Scitaminaceæ,
Capparidaceæ,	Araliaceæ,	Hæmodoraceæ,
Cistaceæ,	Cornaceæ,	Alismaceæ,
Violaceæ,	Caprifoliaceæ,	Pontederiaceæ,
Droseraceæ,	Ericaceæ,	Melanthaceæ,
Tiliaceæ,	Myrsinaceæ,	Smilaceæ,
Ternstroemiaceæ,	Ebenaceæ,	Hypoxidaceæ,
Hypericaceæ,	Oleaceæ,	Commelinaceæ,
Aceraceæ,	Boraginaceæ,	Araceæ,
Sapindaceæ,	Gentianaceæ,	Typhaceæ,
Rutaceæ,	the tribe Convolvuleæ,	Naiadaceæ,
Melastomaceæ,	Lentibulariaceæ,	Eriocaulaceæ, and
Cucurbitaceæ,	Proteaceæ,	Lycopodiaceæ.
Passifloraceæ,	Thymeleaceæ,	

The absence of bogs and of spongy soil, whether wet or dry, may account in part for the absence of Ericaceæ, and for the rarity of Australian analogies; these being traceable only in the abundance of *Myrtaceæ*, and in one of the species bearing some general resemblance to a Leptospermum.

5. The Chilian mountain-region, on the slope of the Andes.

Returning to the 20th of April; to our party on horseback ascending among hills and ridges a wide mountain-valley of the Andes, devoid of fearful precipices and deep ravines. We at length emerged from the hills, as the bottom of the valley became more even; the columnar Cereus having disappeared, together with the Myrtaceæ and all large shrubs, and *grasses* even becoming rare. Ever since leaving the coast, the climate had been increasing in aridity; the increase being now more decided, at the end of some six miles from the carriage-road, and at the estimated elevation of about six thousand feet, we entered a new botanical region; marked by the *Chuquiraga* suddenly making its appearance.

The vegetable growth soon entirely changed in character; becoming much denser, very uniformly from one to two feet high, and composed principally of spinescent plants: more generally spinescent than in Patagonia, and unaccompanied by any tendency in the leaves to become diminutive. The spinescent plants consisted of the *Chuquiraga*, everywhere conspicuous: and intermingled more or less abundantly, the *Berberis empetrifolia;* a second species of *Berberis*, somewhat rare; *gen. Nassauv.*, having entire sharp-pointed leaves; *gen. Rosac.?* with fasciculate leaves, rigid linear and pointed; *Mulinum spinosum*, closely resembling the Patagonian species, and exceedingly abundant; *gen. Legum.*, imitating the last-named plant in its divided spinescent phyllodia; and the *Pentaphorus*, now much stunted, with tapering rigid twigs. The prevailing habit of growth extended even to a species of *Verbena;* which, though scarcely more than herbaceous, put forth abortive branchlets, pointing in various directions like long green spines.

Other plants, not spinescent, yet well harmonizing with the above in their rigid and branchy stunted habit, were intermingled: as *gen. Legum.* with linear leaflets; several *Aplopappi;* a *Baccharis;* two *Liatroid* shrubs; and the *Ephedra*, now depressed to the prevailing average stature. A few species, however, refused to conform; their fresh, unmodified aspect and foliage seeming out of place: as, an ornamental *Solanum*, having lanceolate and somewhat coriaceous leaves; and especially, two or three yellow-flowered *Senecios* with dark-green foliage.

The acclivity becoming steeper, the vegetable growth gradually and very regularly became more and more depressed, scattered in beds with the intervening soil left bare; the spinescent plants more and more predominating. The discovery was soon made, that interesting and ornamental plants were growing in the district; not in the open ground, but to be sought for in the shade and shelter of boulders and projecting rocks: localities requiring examination were thus pointed out in the distance; and on visiting several, we procured the following plants: three species of *Loasa; Schizanthus Grahami?;* an *Acœna?; gen. Acœnoid*, large, with Xanthium-like fruit; a Galium-like *Larrea*, belonging to the Desert-tribe of the Zygophyllaceæ; *gen. Valerianac.*, a hard and rigid plant, with the leaves entire; a green-flowered *gen. Phytolaccac.;* and a showy *Alstrœmeria.*

Wherever there were slight ravines containing mountain-rills, the vegetable growth along their banks resumed its wonted aspect; presenting only such forms and genera of plants as are usual elsewhere in moist, springy situations.

This botanical region varies in width along the slope of the Andes according to the steepness; but in the two places where we crossed, going and returning, measured about eight miles. The following plants were found growing in the Chilian mountain-region, between the elevation of six thousand feet and that of ten thousand:

Berberis empetrifolia, (No. 6); see Lam. 253, fig. 4. Abounding towards the upper margin of the region.*

——— (No. 7); leaves pubescent, obovate, entire. Rare.

(Sphæralcea? No. 2; recorded as) Malva?. Prostrate; leaves pubescent, roundish, five-lobed, the under surface white. Rare.

Viviania? (No. 1). Leaves opposite, entire, white beneath; flowers red; five calyx-teeth; five petals; stigmas three, and the capsule three-celled. Growing among the spinescent plants, (and sheltered by them).

Oxalis rosea, (No. 24). Taller than the next species; the flowers lilac. Found by Mr. Brackenridge.

——— (No. 25); small, hairy; the root woody.

——— (No. 26); leaves glaucous; the leaflets deeply notched. Found by Mr. Brackenridge.

Larrea (No. 2). Having the habit of Galium; the root woody. In the upper portion

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*Erodium (bis lower down). Only two to three inches high. Frequent, and seemingly indigenous; (the only introduced or displaced plant we met with on the Chilian Andes.)

of the region, growing in clefts of rocks, and in the shade of detached blocks or boulders.

Colletia? (bis No. 3 lower down), and seeming properly to belong there. The spines opposite; leaves pubescent, obtuse, entire.

Nov. gen. Legum. (No. 1). A low shrub, having in place of leaves only phyllodia, which are Mulinum-like and trifid at the apex, with two additional divisions embracing the stem; flowers large, yellow; the calyx pubescent; the pod six-seeded.

Astragalus? (No. 19). Upright, herbaceous, smooth; having broad stipules; leaflets in twelve pairs, lanceolate-linear, pointed.

Gen. Legum. (No. 1). A low shrub, rigid and branchy, but not spinescent; leaflets in about four pairs, linear; flowers and fruit not seen. Found by Mr. Brackenridge.

Acæna? (No. 5); the flowers not seen. Growing in the shade of detached blocks or boulders.

——— ? (No. 6); perhaps distinct; the leaves smaller, densely pinnate. In the upper portion of the region, growing in the shade of detached blocks or boulders.

Nov. gen. near Acæna (No. 1). A large plant; the fruit Xanthium-like. In dense beds in crevices of rocks; rare.

Gen. Rosac.? (No. 2); a congener of No. 1 Chili. A low shrub; the leaves rigid, subulate, spinescent, perhaps real ochreæ, each sheathing a fascicle of true linear leaves; fruit quadrialate, crowned with the calyx, as in Scleranthus. Abundant.

Quillaia smegmadermos, (bis No. 1 lower down).

Epilobium (No. 21); leaves tenderly herbaceous, broad; capsule long-pedicelled. Growing on the banks of rills.

Loasa (No. 3); leaves ovate, acute at each end, dentate; flowers white. Found by Mr. Brackenridge.

——— (No. 4); leaves much divided; large white flowers. Growing in the shade of detached blocks or boulders.

——— ? (No. 5). Stemless; leaves pinnatisect; flowers yellow, and also in size Ranunculus-like. In clefts of rocks along the upper margin of the region; rare.

Ribes (bis No. 13 lower down), and seeming properly to belong there. Softly pubescent.

Escallonia (bis No. 4 lower down), and seeming properly to belong there.

——— (bis No. 5 lower down), and seeming properly to belong there.

Hydrocotyle (bis No. 20 lower down).

Mulinum spinosum, (No. 2); much resembling No. 1 North Patagonia; compare also M. echinus of Dec. The leaves mostly trifid. Abundant.

Gen. Valerianac. (No. 1). Stems procumbent at base; suffruticose?, hard, rigid; leaves entire. In the upper portion of the region, forming beds in the shade of detached blocks or boulders.

Gen. incert. (No. 1). Leaves pinnatisect, Brassica-like, but opposite; the flowers not seen. Found by Mr. Brackenridge.

Mutisia inflexa, (bis No. 3 lower down).

(Chuquiraga No. 2); Barnadesia of some writers. The flowers yellow. Abundant and conspicuous; marking with great precision the commencement, or lower boundary of the region.

Pentaphorus? (bis No. 1 lower down), but more rigid and stunted.

(Nardophyllum? No. 1); gen. Liatroid. A stunted, branching shrub, rigid, but not spinescent; flowers Liatris-like, solitary, terminal; glandular-pubescent; branches of the style long-exserted, lanceolate. Frequent.

(——— No. 2); a second species. Stunted, rigid, and branchy, but not spinescent; the twigs and under surface of the leaves white; the leaves small; the flowers or capit. more slender, with but few florets. Frequent.

Acanthophyllum (No. 1); gen. Nassauv. Leaves entire, rigid, subulate, spinescent. Abounding in the upper portion of the region.

Perezia? (No. 1). Arctotis-like; stemless; the leaves radical, runcinately pinnatisect; the flowers large. In the upper portion of the region.

Solidago linearifolia, Dec.? (bis No. 24 lower down), and seeming properly to belong there.

Aplopappus (No. 6). Stunted, rigid, and branchy, but not spinescent; very viscous. Found by Mr. Brackenridge.

——— (No. 7); a second species. Found by Mr. Brackenridge.

——— (No. 8). Stunted, rigid, and branchy, but not spinescent; leaves very viscous, obovate, argutely-dentate. Found by Mr. Brackenridge.

——— (No. 9); gen. Compos. Leaves radical, clustered; flowers yellow; the calyx-scales linear, recurved. Found by Mr. Brackenridge.

Baccharis (No. 23). A foot or so high; being stunted, rigid, and branchy; leaves cuneate, dentate; flowers larger than usual, solitary. No specimens.

Senecio (No. 31); like S. aureus. Found by Mr. Brackenridge.

——— (No. 32); leaves entire, glaucous; flowers yellow. Found by Mr. Brackenridge.

——— (No. 33); leaves dark-green, incised at the apex; flowers yellow. Maintaining the usual habit of its tribe, notwithstanding the aridity of the climate.

———? (No. 34). Prenanthes-like; the leaves runcinate. Found by Mr. Brackenridge.

Gen. incert. (No. 1). Herbaceous, and softly pubescent; leaves alternate, attenuate, obovate, crenate; the flowers not seen.

Aldea (bis No. 2 lower down).

Gen. Hydroleae? (No. 1). Evolvulus-like; the leaves entire, but opposite; the capsule two-celled.

——— (No. 2); perhaps not distinct. Pulmonaria-like; the leaves entire, but opposite; flowers blue; the calyx monophyllous. Found by Mr. Brackenridge.

Solanum (No. 56). Agreeing in habit with No. 55, as though altogether unaffected by the aridity of the climate; ornamental; leaves linear-lanceolate, involute, and somewhat coriaceous.

Schizanthus Grahami? (No. 1). In the shade of detached blocks or boulders; rare.

Mimulus (No. 15); perhaps distinct from No. 13; more pubescent and glutinous. Prostrate, creeping, rooting at intervals; flowers small, yellow, Gratiola-like. Growing on the banks of rills.

Buddleia (bis No. 3 lower down), and seeming properly to belong there. A shrub; with the flowers in globose capit.

Stachys (No. 8); resembling Valparaiso sp.

Verbena (No. 16). Much branched; and though herbaceous, the branchlets degenerating and assuming a spinescent aspect, in imitation of the surrounding vegetable growth.

Boerhaavia (bis No. 12 lower down), and seeming properly to belong there.

Nov. gen. Phytolaccac. (No. 1); compare P. drastica of Poeppig. The flowers green, Pyrola-like; the berries red. In the upper portion of the region, growing in the shade of detached blocks or boulders.

Quinchamalium Chilense, (bis No. 1 lower down); small green flowers.

Euphorbia (bis No. 46 lower down). Eight inches high; the leaves obovate, entire.

Ephedra (bis No. 1 Patagonia, and lower down in Chili). Stunted, and more branched than when growing below in the level country.

Sisyrinchium (No. 15). A withered stem only; the spathes broad. Found by C. P.

———? (No. 16); habit of Lygeum. Found by Mr. Brackenridge.

Alstrœmeria (No. 3). Four to six inches high; bearing a large, upright flower. In the shade of detached blocks or boulders.

Isolepis (bis No. 8 lower down). Two to three inches high, cespitose; a lateral spikelet.

Stipa? (No. 18). The corolla-glumes red; awn widely plumose at base.

Agrostis (No. 32). Found by Mr. Brackenridge.

Hordeum? (No. 7). In the upper portion of the region.

6. The Alpine Region of the Chilian Andes.

At noon we reached the head of the wide mountain-valley, and entered the Alpine region; commencing on the brow of the branching ridge. Our party here separated; Mr. Dana and myself continuing on, accompanied by a guide (of Aboriginal parentage). The acclivity gradually becoming more gentle, in half an hour we crossed the rounded summit of the ridge; we then turned Northeast, and followed the crest, all the way perceptibly ascending.

The vegetable growth becoming more and more depressed, at length separated into small condensed beds, that soon became widely detached; and we sometimes rode an eighth of a mile over bare soil, loose and dry, and interspersed angular fragments of rock, without passing a single cake of herbage.

Accustomed to associate moisture with mountain-tops, I had never dreamed of the existence of an Alpine Desert: but here, aridity kept increasing with the cold; the stillness awful and universal, as though we had entered the domain of silence. From the crest of the mountain-ridge of La Dessa, we were looking across an abyss upon the Andes; their altitude doubled, the weather clear, and the extreme snowy peaks in sight, North and South, hardly less than three hundred miles apart.

In the North, out of the endless series of crowded, crest-like summits, Aconcagua rose above the rest, steep and inaccessible to its pointed apex; and a further slender and faintly visible streak, which

was asserted by our guide to be smoke. But leaving on either hand the more distant snowy peaks, the eye rested mainly on the enormous mountain-mass directly opposite; a scene of grandeur and desolation.

We met some horsemen conducting a dozen mules laden with snow, on their way towards the distant city; and about two hours before dark, we arrived at the source of supply; an extensive permanent bank of hardened snow. We hastened to dismount, for a nearer view of the mode in which aridity, combined with Alpine elevation, had been provided for in the vegetable growth.

Congested patches of *Umbelliferæ*, hardly distinguishable from those of Terra del Fuego, showed at once, that the Alpine habit of growth is independent of the proportion of moisture. These patches proved however more densely impacted and indurated than I had supposed possible in the vegetable kingdom; being as hard and even as a floor; and specimens had to be procured with a hammer, by breaking fragments from the margin.

Here and there in the Desert, cakes of less congested herbage seemed at a distance more luxuriant. On approaching, the botanist found only an increase of difficulties; the component plants being spinescent, presenting on all sides thorns, not of the ordinary pointed kind, but intensely sharpened, so that the least touch drew blood. If plants of a different character were sometimes present, these grew intermingled and unapproachable in the midst of armed protection; and notwithstanding every precaution, each specimen here collected literally took its revenge in blood. The spinescent beds, two to three inches high, were each made up of a single kind of plant: the most frequent being the *Chuquiraga*, more congested than below, and altogether depressed to the prevailing level; two species of *Nassauvia*, excessively troublesome from the acuteness of the points of their leaves; a second species of the *gen. Legum.* with branching spinescent phyllodia; and an *Adesmia*, presenting above and around nothing but a cake-like chevaux-de-frise of branching thorns.

One of the yellow-flowered *Senecios*, devoid of any spinescent tendency, yet conformed in outline; and grew in widely-detached, congested, cake-like beds. The *Ephedra*, too, frequent at intervals all the way from the sea-coast, had at last assumed the same congested mode of growth, in detached Alpine cakes.

Another form of adaptation was remarked; in a tendency to produce long, close-set hairs, like a furry envelope. Here and there in

the Desert, we met with what seemed at first a tuft of animal wool; on closer examination, it proved to be a growing plant, *gen. Compos.*, diminutive and having a slight root as if annual, the leaves and stem concealed from view amid long white woolly hairs. Something of the same tendency was remarked in *gen. Portulacac?*, and in a *Plantago;* the latter, growing not in the Desert, but in situations kept moist by melting snow.

Towards sunset, the upper portion of the Andes opposite changed in color, as on the preceding evening, to clear yellow. But there was a practical question before us: in the increasing cold, and the coming on of night; the only shelter being a circular wall a foot high, built of loose stones. A fire was indispensable, and we began to collect material; wondering in the mean time at the composure of our guide, with whom we could not readily communicate. At length, he produced an axe; and, much to my astonishment, attacked the floor-like patches of Alpine *Umbelliferæ;* disclosing large, woody, underground branches, with lumps of resin copiously interspersed; the living plant, as we soon perceived, making excellent and long-enduring fuel. The circular wall, eked out with saddles and horse-gear, proved at night extremely serviceable in keeping off the wind; and, having the additional protection of blankets, we did not suffer from the cold. The moon was bright and clear; and the stillness interrupted only by the champing of the horses, and now and then a strange muttering, as the wind swept the crags and surface of the Desert.

The morning of the 21st proved extremely cold, the trickling rills from the bank of accumulated snow being all frozen solid; this weather was perhaps exceptional, for we learned subsequently, that the same morning was regarded as "a cold one," at Santiago. The bank covering several acres under a Southern exposure, and for "many years" proving the most accessible source of supply for the city, probably marks the least elevation in this Latitude of the perpetual snow. Similar patches, but much more extensive, were frequent on the Andes opposite; the ground continuing bare at intervals almost to their summits; many of which were five or six thousand feet higher than the spot on which we were standing. In the distance, the snow-patches resembled those of Terra del Fuego; their consistence was now ascertained to be very similar, firmly impacted, but drier and more friable. There were no signs of glaciers; and in this elevated arid district, rain is perhaps unknown.

Along the margin of the accumulated snow, the slope and concavities were for some distance moistened by the slight occasional melting. The vegetable growth here differed widely from that in the Desert, presenting only the usual Alpine character; with many points of agreement with Terra del Fuego, and species of plants that at first seemed identical, but on closer examination, proved distinct. *Grasses* occurred amid this moistened Alpine growth, especially in clefts of rocks; and proved, as in Terra del Fuego, to belong to familiar European and Northern genera.

But our guide would not permit us to linger, pointing to the threatening weather; as a fall of snow would render it difficult to keep the path on our way back. We therefore set out before sunrise. After re-crossing the ridge, and reaching the margin of the wide mountain-valley, the danger was over, and we sent on the guide with the horses. Mr. Dana being desirous of examining the rocks, which were exposed at intervals along this margin, we proceeded at about the same elevation for some miles Southwest.

The following plants were found growing in the Alpine region of the Chilian Andes, above the elevation of ten thousand feet:

Ranunculus (No. 25); leaves multifid, the segments linear. In moist places, along the margin of the bank of accumulated snow; rare.

Cardamine (No. 13); one to two inches high. In moist places, along the margin of the bank of snow.

Sagina (No. 3); diffuse, leafy; the leaves obtuse; the flowers small. In moist places, along the margin of the bank of snow.

(Colobanthus? No. 3); near sp. of Terra del Fuego. Cespitose; flower on a long, naked pedicel, but the calyx five-cleft. Along the margin of the bank of snow.

Cerastium (No. 11). Intermingled in the beds of spinescent plants, and sheltered by them in the Desert.

Nov. gen. Legum. (No. 2). Densely cespitose; having branching trifid spinescent phyllodia in place of leaves; the calyx-teeth pointed; pod short, rhomboidal, smooth, shining, pointed, one-seeded. Growing in cake-like beds in the upper portion of the Desert, towards the snow.

Astragalus? (No. 20). Diminutive, appressed to the ground; stipules large; leaflets in five pairs. In the lower portion of the Alpine Desert.

Adesmia (No. 5). Cespitose, growing in beds two or three inches high, the terminal branching thorn included; leaflets in two pairs, large. Growing in the upper portion of the Desert, towards the snow.

Montia (fontana? No. 1). In moist places, along the margin of the bank of snow.

Gen. (Portulacac.? No. 1). Habit of Cerastium, but the leaves alternate; sepals two; capsule coriaceous, three-valved. Intermingled in the beds of spinescent plants, and sheltered by them in the Desert.

——— (No. 2); a second species. Smaller; the leaves strigosely-lanate. Intermingled in the beds of spinescent plants, and sheltered by them in the Desert.

Fragrosa? (No. 3). Densely congested; the leaves incised, pilose on the upper surface; mericarps angular, as in Bolax, and crowned with the persistent calyx; the calyx-teeth pointed. Growing in large floor-like patches, impacted, indurated, and even above; but in reality underground trees, having large woody branches, though perhaps not rooting very deeply. Lumps of a resinous exudation copiously interspersed. The floor-like patches were observed to occur not only in the Desert, but in places soaking with moisture from the melting snow.

Azorella? (No. 4). Densely congested, and agreeing in habit with the preceding plant; the leaves entire, pointed; fruit large, gibbous, entirely smooth. Growing in the upper portion of the Desert, towards the snow.

Mulinum acaule? (No. 3). Cespitose, growing in even-topped beds that resemble those of Diapensia Lapponica; (fruit sessile on the crown of leaves). Growing in the lower portion of the Alpine Desert.

Macrorhynchus? (No. 2). Low, depressed; leaves runcinately-pinnatisect; calyx-scales pubescent on the margin. In the lower portion of the Alpine Desert.

(Chuquiraga; bis No. 2 lower down, in the Middle Mountain-region). Extending throughout the Alpine Desert to the vicinity of the accumulated snow.

Gen. (Facelid? No. 1). The root slight, as if annual; the whole plant an inch high, but covered up, and concealed among long wool; the leaves triangular, broadest at the apex, with a projecting mucro; the flower or floret-rays dark crimson. In the lower portion of the Alpine Desert.

Nassauvia aculeata, Pœpp.? (No. 3). Growing in beds, a few inches high; the leaves so sharply spinescent as to prove exceedingly troublesome. In the upper portion of the Desert, towards the snow.

——— sericea, Pœpp.? (No. 4). Procumbent, forming beds a few inches high; leaves sharply spinescent, and as troublesome as those of the preceding species. In the upper portion of the Desert, towards the snow.

Gen. Compos.? (No. 1). Leaves opposite, linear; long, lax scales; white toment. Growing along the margin of the bank of snow.

Gen. Compos.? (No. 1). Herbaceous, presenting the Alpine aspect and habit of growth, but of extremely light consistence; leaves stellately-disposed, lanceolate, crenately-dentate, hairy on the upper surface.

Erigeron? (No. 14). Having the habit of Noticastrum; the stem and leaves pilose. Growing along the margin of the bank of snow.

Aploppapus (No. 10); leaves tenderly herbaceous, obovate, paucidentate. In the lower portion of the Alpine Desert.

(Werneria? No. 1). Nov. gen. Senec. Having the habit of Tripolium; but stemless, or the flower radical; calyx monophyllous, terminating in about ten calyx-teeth. Growing in moist places along the margin of the bank of snow.

Senecio (bis, either No. 32 or 33 of the Middle Mountain-region). The flowers yellow. Growing in dense depressed beds throughout the Desert to the vicinity of the snow.

Gen. incert. (bis No. 1 lower down, in the Middle Mountain-region). Leaves alternate and obovate; the flowers not seen.

Pratia (No. 2); the leaves Viola-like. Growing in moist places along the margin of the bank of snow.

Aldea (bis No. 2 lower down, to the base of the Andes and the vicinity of the sea-coast); strigose. Presenting now the Alpine habit of growth, and forming depressed, cake-like beds throughout the Desert to the vicinity of the snow.

Gen. Hydroleac.? (No. 3); a third species. The leaves pubescent, ribbed, obtuse, having an interpetiolar stipule; summit of the plant full of flower-bracts, but the flowers not seen. Intermingled in the beds of spinescent plants in the upper portion of the Desert, towards the snow.

Calceolaria (No. 8); leaves broad, Plantago-like, and appressed to the soil. Growing on the wet overhanging borders of a rill, below the accumulated snow.

Plantago (No. 34). Cespitose, half an inch to an inch high; long wool at the base of the leaves; the spikes few-flowered. In moist places along the margin of the bank of snow.

Polygonum (No. 33). Having the habit of P. aviculare; the root woody; the stem with scarious (or membranaceous) sheaths. In the lower portion of the Alpine Desert.

Quinchamalium (No. 2). The leaves broad-lanceolate, spatulate. Intermingled in the beds of spinescent plants in the upper portion of the Desert, towards the snow. Figured by Mr. Agate.

Ephedra (bis No. 1 Patagonia, and lower down in Chili to the base of the Andes and the vicinity of the sea-coast). Presenting now the Alpine habit of growth, and forming densely-congested cake-like beds throughout the Desert to the vicinity of the snow.

Juncus (No. 39). Resembling J. triflorus, but dwarf, only one to two inches high. In moist places, along the margin of the bank of snow.

Gen. Restiac.? (No. 1); Schœnus-like, or compare Oreobolus. One to two inches high; and having a terminal spike. Densely cespitose; growing in moist places, along the margin of the bank of snow.

Isolepis (No. 9; compare No. 8 of the Middle Mountain-region). Finer than at Valparaiso, and perhaps a distinct species.

Phleum (No. 5). Resembling P. alpinum, but the spike short. In moist places along the margin of the bank of snow.

Stipa (No. 19); perhaps a third species; the florets being larger. The guanaco grass. Growing in the neighborhood of the accumulated snow.

Agrostis (No. 33). Dwarf; one to two inches high; the leaves very slender, filiform. Cespitose; growing in moist places, along the margin of the bank of snow.

——— (No. 34). Having the habit of the preceding; the sheaths broader. Growing along the margin of the bank of snow.

Aira (No. 11); the glumes long, and Avena-like. Growing along the margin of the bank of snow.

——— (No. 12). Having the habit of A. caryophyllea; the florets small. Growing along the margin of the bank of snow.

Trisetum (No. 6; compare Terra del Fuego). Like T. subspicatum. In moist places, along the margin of the bank of snow.

———? (No. 7); or compare Festuca. Panicle coarctate; the florets short, and awned. Growing along the margin of the bank of snow.

Poa (No. 22); leaves short; the thick sheaths forming a hardened mass at the base of the culm; panicle elongate, and coarctate. In the neighborhood of the bank of accumulated snow.

——— (No. 23); like P. annua. Lax-growing, and unobtrusive. Occurring in moist places, along the margin of the bank of snow.

(Hordeum?; bis No. 7 lower down, in the Middle Mountain-region). Extending into the Alpine district.

Marchantia (No. 9); the frond thickened and coriaceous. Growing along rills, below the margin of the accumulated snow.

Bryum? (No. 8). In moist places along the margin of the bank of snow.

Hypnum (No. 25). A fine species. Growing in moist places along the margin of the bank of snow.

Musc. incert. (No. 1); an undetermined moss. Growing in moist places along the margin of the bank of snow.

——— (No. 2); another undetermined moss. Growing in moist places along the margin of the bank of snow.

Towards noon, we commenced the descent; and proceeding rapidly down the declivity, the transition from winter into summer proved very sudden; the heat below being oppressive. We reached the carriage-road in the middle of the afternoon; entered the vehicle in waiting, and continuing on, arrived at Santiago at dusk.

On the 22d, our party left Santiago at 1 P.M., returning Westward; and at 8 P.M., we stopped for the night at Coracovi. On the 23d, we set out at 8 A.M.; and having the whole day before us, stopped at two or three localities on our way back to Valparaiso; where we arrived, towards evening.

Anchors suitable for holding the ship against the heavy waves rolled in by occasional shifts of wind, called "Northers," could not be procured at Valparaiso. The Relief was therefore obliged to depart, and sailed on the 1st of May, with a light breeze that sprung up towards evening.

We were on our way towards a safer harbor in the North; the wind, on the 2d, favoring us throughout the day.

CHAPTER VI.

PERUVIAN REGIONS.

On the 3d, the breeze favored us throughout the day: an Antarctic bird, the Cape petrel, Procellaria Capensis, unexpectedly making its appearance so near the Tropic, gave warning, that the climate continued cool.

1. The Atacaman Desert-region.

In sailing North along the continent, the direct course soon led us at a distance from the land. We saw nothing of the Atacaman coast, described as Desert; though when moisture is deposited at intervals of twenty years or more, plants are said to spring up.

On the 7th, the Latitude gained was "21° 05′ S.:" and we were nearly at our greatest distance from the land; the coast soon beginning to incline Westward, so as to be exposed to the perpetual South wind from the sea.

2. The Peruvian Desert-region.

On the 10th, the Latitude gained was "16° 25′ S." And on the 11th, the Relief was drawing near the Peruvian coast.

At daybreak on the 12th, there was another call on deck to look at the Andes. The ledge in the Eastern horizon intercepting the sun, was now flat-topped throughout its whole length, with two diminutive projecting points barely distinguishable on the crest, and there was no illuminated outline. The land seemed quite near, for about

an hour; when the angle of light from the sun having changed, it disappeared; and only after sailing onward for hours, again came into view. At noon, the Latitude was found to be "12° 31′ S."

In the afternoon, we were so near, that the Andes assumed the form of separate peaks, on several of which the snow was distinguishable. And at 10 P.M., the Relief anchored in the harbor of Callao; situated in "Lat. 12° 02′ S."

When daylight came on the morning of the 13th, the Andes were observed to be nearer the sea than at Valparaiso. We looked up a valley, traceable by decussating mountain-crests, each succeeding one rising higher in the distance; in fact, the whole country seemed full of mountains and mountain-ridges; yet the general ascent so uniform, that the base of the Andes seemed to commence at the sea-shore.

GEOLOGICAL STRUCTURE. On landing, and in the course of our subsequent excursions, the geological structure was found to agree with that of Chili, even to a seeming continuity of rock-formations; but with the addition, of an outside strip of *sedimentary rock*. This strip is chiefly submarine; but includes the projecting promontories, and the linear series of outlying islets extending along the coast; as San Lorenzo, Fronton, and the Pachacamac Islets. The rock proved argillaceous; its disturbed stratification and the presence of an Ammonite, marking a very early period; earlier, probably, than the Cretaceous or chalk formation, but perhaps contemporary with the Lias. An allied species of Ammonite "from Truxillo" afforded proof, that this strip of sedimentary rock extends more than three degrees farther North.

The *granitic formation* was ascertained to be about forty-five geographical miles wide; extending from the coast to a little beyond Yaso. The rock proved exceedingly variable in composition and aspect; being in many places coarse-grained, and readily recognized as granite; but over extensive areas, jagged, full of seams, and altogether argillaceous; presenting often a semblance of stratification that might deceive even a practised eye. Of contained minerals, *epidote* was occasionally present; but I did not meet with garnets. The unusual ruggedness of the surface of the country was evidently in part due to the absence of rains; decomposition taking place more slowly, and many ridges of rock remaining bare, that in a rainy climate, would have been deeply coated with earth.

The trachytic or *trap formation* succeeded inland; the hills for

some miles beyond Yaso, being on one side of the river of granite, and on the other side of *porphyry;* at length, the two formations met in a mountain-ridge, and were traced to within a very short distance of each other. The porphyry was observed to be normal and well characterized, much resembling the Swedish and that of the vicinity of Boston. The bed is the source of the numerous pebbles of similar consistence on the sea-shore North and South of Callao; and proved extensive, but does not exclusively constitute the trap formation. This extends up the basal portion of the Andes; being perhaps twenty geographical miles wide; but its Eastern margin was not definitely ascertained.

The Andes presented in fact a good deal of the character and outline of an immense ledge of *sedimentary rock:* contemporaneous even with the strip along the sea-coast; for an Ammonite, picked up by myself within thirty feet of the perpetual snow, proved to be a third allied species. "*Coal* of a highly bituminous quality" was said to be procured in the upper district, and to be "used extensively at Pasco and other places." At Baños, we observed a quantity of *gypsum,* said to have been "brought for manure from the vicinity of Casa-Cancha." We visited also the copious *hot-spring* near Baños; but nowhere on the Peruvian Andes could we hear of volcanoes. As far as examined by myself, the crest and upper portion of the Peruvian Andes consisted mainly of *conglomerate;* the included pebbles being very regular in shape, and as smooth and polished as though sea-washed: it is true, the pebbles formed in the rapidly descending torrents around were very similar, and smoother than I ever before remarked in fresh water: the conglomerate in some places consisted of very diminutive pebbles, but hardly became normal sandstone.—The silver mine at Alpamarca, on an eminence reaching nearly to the perpetual snow, was observed to be contained in compact bluish rock, probably impure *limestone;* traversed at least by numerous seams of calcareous spar, of hard, opaque consistence, and having something of the lustre of satin spar. The snowy peaks on the crest of the Andes farther North, proved to be composed of the same rock, in a similar manner seamed with calcareous spar; and lower down, at Baños, we found the rock burned for lime.—Owing, it would seem, in part to the slate-colored rock, the peaks of the Peruvian Andes, wherever free from snow and from vegetation, were black and sombre; presenting nothing of the play of colors witnessed in Chili.

FACE OF THE COUNTRY AND CLIMATE. But for the snow and rain falling on the Andes, and collecting in streams that on their way across the Desert, afford the means of irrigation, Lower Peru would be uninhabitable.

Back of Callao and the sea-shore, the deceptive plain extends, so often spoken of; where, at the end of six miles over a seeming level, the traveller is perplexed by the ocean continuing in sight; the barometer however furnishes an explanation, in a change of level of not less than five hundred feet. This evenly inclining plain is an example on a large scale of all the valleys and ravines of Lower Peru; these, I found filled to the same level from side to side, the bottom presenting an even surface regularly declining outwards; and the *absence of rains* demonstrated by the absence of a midway channel. (A point of difference from the Deserts of the Eastern Continent, which I subsequently found furrowed with marks of occasional torrents).

In the absence of variable winds, and of simooms or dry windstorms, a strong, steady breeze comes perpetually from the South; so that in exposed situations, the surf is extremely heavy. In proof of this constant direction, the harbor at Callao, regarded as "one of the safest in the world," is not in the least indented in the coast; but owes its safety to the oblique position of two islets that intercept the heavy ocean-swell coming from the South. The North African Desert has been attributed to air returning towards the Equator, after having parted with its moisture in cooler climates; the same explanation seems applicable to the Peruvian Desert; except only, that this extends more than ten degrees nearer to the Equator.

Unexpectedly in a Desert climate, there is a constant feeling of moisture in the atmosphere. The sky is so generally overcast, that astronomical observations are nearly impracticable at Lima; and so imminent does the danger often seem of rain, that the stranger long hesitates to lay aside his umbrella. During our stay, the sun was invariably obscured in the mornings; but usually in the course of the day, became visible for at least a few moments. A *drizzle* or heavy mist, called the "almozo," was quite frequent, taking the place of both dew and rain; moistening the bare soil, to such a degree in one instance, that I observed the commencement of flowing water; a contingency so rare, that no provision against it is required in planning streets and houses. According to Reynolds in the Cruise of the Po-

tomac, the Records of Lima mention, that "*rain* fell in the years 1701, 1720, 1791, and 1806;" and that there was "*thunder* and *lightning* in the years 1552, 1720, 1747, and 1804."

In a Tropical climate, and so near the Equator, I was greatly surprised at finding cloaks and woollens worn in the streets of Lima. I was told, on inquiry, that it was "winter:" and soon ascertained, that seasons are distinguished, with heat and cold, notwithstanding the extremely slight variation in the weather and temperature. Mr. Bartlett, during some years spent in Lima, had found the *temperature* varying only "from 60° Fahr. to 85°:" and Mr. Thomas, at his residence "a few leagues farther South," had found the variation only "from 62° to 79°." The lowest temperature obtained by myself at Lima was 62° Fahr., observed in the open air at half-past ten in the evening of June 10th: the highest, fairly obtained, was 76°, in the afternoon of May 31st; but on another occasion, the thermometer, exposed under woollen to the direct rays of the sun, rose to 82°. From the 2d to the 13th of June, the morning temperature at Lima between the hours of seven and eight, observed in my room facing the West, the window wide open day and night, varied only from 65° to 69°. In the harbor at Callao, I found the mornings cooler; and on the deck of the Relief, at 7½ A.M. on the 14th of June, I obtained 60°; and at 11 A.M. on the 15th, 61°.

I made at Lima but one observation on the subterranean or mean annual temperature: on the 11th of June, a thermometer placed in a fissure at the bottom of an archway under ground, indicated rather less than 68°; the time being 5¼ P.M., and the temperature above ground in the open air, 65°.

The changes in the weight of the atmosphere appear to be very slight at Lima; the column in the *barometer*, according to Mr. Bartlett, "scarcely varying three lines."

EARTHQUAKES. We had arrived not only in the "winter," but in the "earthquake season:" and three shocks were experienced during our stay. The first took place on the 16th of May towards midnight; our party being "seven leagues" North of Lima at Caballeros: I was awakened by a long-continued noise, like the rolling of a cannon-ball on a floor overhead; and by a sickening sensation, that was certainly not mental, for I had no thought at the time of earthquakes: the sickening sensation was afterwards spoken of by others of our party, and attributed by them "to the motion being communicated." Ac-

cording to the people of the country around, this would have been a "temblon," or powerful shock, "but did not get to the surface."

The second shock, a slight one, or a "temblada," took place about 10½ P.M. on the 5th of June; and was generally perceived at Lima by persons within doors; its reality was confirmed in a few moments, by the customary ringing of bells.

The third shock, also a "temblada," took place about 8 A.M. on the 10th of June: there seemed a continued shaking of the floor and walls, unaccompanied, as far as I could perceive, with any noise; but on this point, there were different opinions. Accounts of damage by this earthquake at Ica and other places Northward, as the breaking of earthen jars resting against each other, soon reached Lima; and were published officially in the Gazette.

The tides of the ocean are manifest only against its shore; and it may be borne in mind, that the atmosphere has something like a shore in the chain of the Andes; which, for some thousands of miles, walls off half its weight. (I subsequently heard a statement in a letter from Lima, that magnetic change, the falling of the iron bar from the horse-shoe magnet, had been remarked just previous to earthquakes.

Back of Callao, half a mile from and some twenty feet above the sea, stands a cross; said to mark the spot, to which a Spanish frigate was carried by the great wave during the earthquake of 1746. Another cross, half way to Lima, was pointed out as marking the extreme limit, the place where the water stopped. Neither of these monuments has an inscription: and it being on record, that persons were saved on a "rampart" of the fortress at Callao, the vertical height there of the inundation could hardly have exceeded forty or fifty feet.

After leaving Peru we heard, in the course of our voyage, of earthquake waves in various parts of the Pacific: and at the Hawaiian Islands, of local earthquakes that are unquestionably connected with volcanoes.

THE GENERAL VEGETABLE GROWTH. As in other Desert-regions, the vegetable growth in Lower Peru is of two kinds: that of the arid upland; and that of the lowland, infiltrated by river-water. Certain botanical features prevailed however throughout, over both upland and lowland.

NEGATIVE FEATURES. We had again entered the Tropics; yet there were no traces of Tropical luxuriance. There was no forest-growth,

hardly real thickets, even in the infiltrated ground. There were no Palms, Melastomaceæ, Myrtaceæ, Coffeaceæ, Loranthaceæ, Gesneriaceæ, Malpighiaceæ, Araliaceæ, nor epidendric Orchidaceæ. Even *ground Orchidaceæ* were extremely rare; as were also *Cucurbitaceæ*, *Tiliaceæ*, *Rhamnaceæ*, *Apocynaceæ*, and especially *Urticaceæ*.

On the other hand, the temperature of both air and water being comparatively cool, Tropical tribes of plants are in great part replaced by tribes of variable and temperate climates; by *Cruciferæ*, *Geranium*, *Oenothera*, *Galium*, *Valerianaceæ*, *Chenopodium*, *Erigeron*, *Gnaphalium*, and others.

As in all Desert-regions, *Ferns*, *Hepaticæ*, *Musci*, and *Fungi*, were rare. An *Acrostichum* was growing in the infiltrated ground; but with this exception, *Ferns*, besides being very seldom met with, were chiefly confined to artificial localities; to the overhanging banks of deeply-cut irrigating canals. *Hepaticæ* and *Mosses* were also confined chiefly to similar artificial localities; but in a few instances, were met with in crevices of rocks on the upland. *Fungi* were not particularly sought for; but the larger species were certainly rare. On the other hand, *Lichens* proved abundant, as will be explained presently.

The First of the following lists, is of tribes absent from all Western Peru, as far as the snow on the Andes; non-Tropical tribes being arranged in the third column:

Dilleniaceæ,	Araliaceæ,	Magnoliaceæ,
Anonaceæ,	Loranthaceæ,	Fumariaceæ,
Nymphæaceæ,	Coffeaceæ,	Cistaceæ,
Menispermaceæ,	(the genus Xanthium,	Droseraceæ,
Bixaceæ,	Lentibulariaceæ,)	Frankeniaceæ,
Flacourtiaceæ,	Gesneriaceæ,	Aceraceæ,
Violaceæ,	Sapotaceæ,	(the genus Spiræa,
Bombaceæ,	Ebenaceæ,	the genus Potentilla,
Ternstrœmiaceæ,	Oleaceæ,	the genus Fragaria),
Hypericaceæ,	(the tribe Apocynaceæ),	Escallonieæ,
Guttiferæ,	Lauraceæ,	Cunoniaceæ,
Marcgraviaceæ,	Thymeleaceæ,	Cornaceæ,
Erythroxylaceæ,	Elæagnaceæ,	Lonicereæ,
Malpighiaceæ,	Monimiaceæ,	Dipsaceæ,
Rhizobolaceæ,	Aristolochiaceæ,	Calyceraceæ,
Meliaceæ,	the tribe Artocarpeæ,	the tribe Cynareæ,
Rutaceæ,	Cycadaceæ,	(the genus Helianthus),
Ochnaceæ,	Palmaceæ,	the tribe Nassauvieæ,
Celastraceæ,	Alismaceæ,	Ericaceæ,

Homaliaceæ,
Samydaceæ,
(Chrysobalaneæ),
Rhizophoraceæ,
Combretaceæ,
Melastomaceæ,
Myrtaceæ,
Turneraceæ,
Dioscoreaceæ,
epidendric Orchidaceæ,
Smilaceæ,
Hypoxidaceæ,
Araceæ,
Melanthaceæ,
Restiaceæ,
Monotropeæ,
Orobanchaceæ,
Proteaceæ,
the tribe Coryleæ,
the tribe Betulineæ,
Coniferæ proper, and
Hæmodoraceæ.

The Second list is of tribes absent from Lower Peru; but making their appearance high up on the Andes.

Capparidaceæ,
Linaceæ,
Rosaceæ,
Paronychiaceæ,
Crassulaceæ,
Curcurbitaceæ,
Lobeliaceæ,
Gentianaceæ,
Phytolaccaceæ,
Santalaceæ,
Urticaceæ,
Ephedreæ,
Iridaceæ,
Juncaceæ, (and
the genus Lycopodium.)

THE INFILTRATED LOWLAND. In rainless countries, the fact becomes obvious, that soil, earthy or sandy, soaks up moisture by capillary or molecular attraction; and very generally, to the height of six feet or more above the water-level. The vegetable growth sustained by the infiltration of river-water, extends therefore beyond the marshy ground, over the basal portion of the adjoining upland.

The coolness of the air and water in Lower Peru, may account in part for the numerous CHILIAN ANALOGIES: for the presence in the infiltrated ground, of a "chilquilla" or willow-leaved *Baccharis;* a tall species of *Equisetum;* one or more *Gnaphaliums;* a *Calceolaria;* and an abundant willow, *Salix Humboldtiana*, the only kind of tree seen indigenous in Peru.

Natural marshes proved rare; beyond at least the extensive one at the mouth of the Rimac. The river maintains the character of a mountain-torrent to the end of its long course; the water clear and flowing rapidly, but insufficient in quantity to force an open passage to the sea; especially, as the large component pebbles of the sea-beach allow free percolation. The slight obstruction along the base of the heap gives rise to a small pool of back-water, surrounded by drowned land; the tract being further kept up and enlarged by leakage from the artificial canals of irrigation on the rising ground.

Around the margin of the pool, as the water became shallow, an extensive bed of *Scirpus lacustris?* commenced; the close-set stems

arising out of the water, and full twelve feet high. Next outside, were beds yet more extensive of *Typha Truxillensis;* so dense, and so matted with long, trailing, slender-stemmed *Scirpi*, as to be traversed with difficulty: the remainder of the drowned land was chiefly occupied by *Mangilla Jussieui* and *Tessaria legitima*, two shrubs ten to fifteen feet high, that were intermingled in the greatest profusion. Some open spaces contained large rounded leaves, in the distance resembling those of a Nymphæa; but proving to belong to *Hydrocotyle multiflora*. Other and more extensive wet openings were filled with grasses, densely matted, a foot or more high, and consisting chiefly of *Ceresia* and *Paspalums*.

Beyond these, the infiltrated ground, gradually rising and becoming drier, is occupied by an impenetrable canebrake; extending for miles, ten to twenty feet high, and composed mainly of two species of *Deyeuxia?:* the second species being more humble, and of remarkable aspect, from the flabellate disposition of the leaves and the long terminal flower-stem; yet the intermingled beds of *Phragmites communis?* proved so much in unison, that the alternation is usually passed unnoticed by travellers.

On the exposed portions of the river-bed of the Rimac, and generally in the infiltrated ground within twelve miles of the Pacific, the following were among the most frequent plants: of large shrubs, *Cestrum auriculatum?;* a fine, showy *Lantana; Lycium? aggregatum; Buddleia Occidentalis;* and a yellow-flowered *Acacia* having a tree-like outline, its branches spreading from a central stem: of vines, a yellow-flowered *Dolichos*, and some other *Phaseoleæ; Cissus compressicaulis;* a *Mikania;* and two small-flowered species of *Passiflora:* and of other plants, some of them herbaceous; the prostrate *Zapania canescens;* two species of *Jussiæa*, tall and conspicuous; a Gymnogramma-like *Acrostichum*, sometimes five feet high; *Flaveria contrayerva;* two or three species of *Commelineæ;* a suffruticose *Sida;* a *Waltheria; Encelia canescens;* and a low white-flowered *Heliotropium*.

On consulting with Captain Long, and finding there would be time for an excursion to the Andes, a party was formed; consisting of Messrs. Rich, Agate, Brackenridge, and myself. Taking a guide and mules, we set out from Lima on the 16th of May. At the end of "seven leagues," we arrived at Caballeros on the Rio de Caxavaillo, the next river to the Northward; and during the night, experienced the earthquake already mentioned.

On the 17th, we started at 6¼ A.M., in a thick fog, which cleared in little over an hour; when the sun proved oppressive for some distance up the valley, as had been predicted. Proceeding over a mountain-ridge, at the end of "five leagues," we reached a third river, and soon afterwards entered the hamlet of Yanga. We kept on the Southern bank of the river for "five leagues" further, very gradually and regularly ascending, and stopped for the night at the hamlet of Yaso.

The Desert-region extends to Yaso, and about two leagues beyond; being in this part of Peru not more than fifty geographical miles wide. The rivers, receiving no accession of water after leaving the Andes, traverse the Desert-region in widely-separated, continuous, long, and very deep mountain-valleys. The one we followed, seldom afforded room for irrigation; but the river-bed was in many places wide, from the water flowing in several channels. Many of the plants abounding nearer the coast had given place to species that were now first met with: as *Schinus molle*, the prevailing shrub along and upon the exposed portions of the river-bed, and another frequent shrub, growing in company, a rose-leaved *Bignonia*, bearing yellow flowers: the canebrakes continued, but unexpectedly consisted of a second species of *Phragmites?*; agreeing at least in the leaves and habit, though not less than twenty-five feet high: and in many places, the canebrakes and other vegetable growth were abundantly mantled with a species of *Clematis*.

The Desert Upland. The infiltrated ground, even as artificially enlarged, is only here and there interspersed, and occupies but a small part of the area of Lower Peru; the remainder constitutes the Desert.

My first near view of the Desert was obtained from Lima; and on proceeding towards a mountain-ridge, I found the soil loose, powdery, and in every direction bare; and for some time, could discover no traces of vegetation. My attention was soon attracted to certain greyish patches on the distant mountain-summits, supposed at first to be some change in the mineral constituents of the soil; on ascending to the nearest one, it proved a bed of intermingled *Tillandsias* and *Lichens*. Having never heard of ground Tillandsias, I was the more surprised at the strange companionship; the Peruvian drizzle nourishing these grey tribes, but not supplying sufficient moisture for a continuous coating of green herbage. On closer examination, the Tillandsias appeared to have originated on rocks; but tufts falling

off, continued to flourish upon the loose, powdery soil at base, and being joined by Lichens spread around in beds.

Two species of *Cereus*, low, bristly, and hardly distinguishable in color from the soil, besides being covered with Lichens, were growing in the Tillandsia-beds, and in their neighborhood: where also the clefts and base of rocks presented plants growing singly, that were devoid of any peculiarity of habit. The same solitary plants occurred in fact throughout the Desert, though at first overlooked; being unobtrusive, a foot or two high, and seldom more frequent than one plant to an acre of ground. These Desert-plants presented no impress of aridity, no tendency to become spinescent, and consisted in great part of the following species: a *Justicia*, bearing long, red flowers; a *Ruellia*, with small, white flowers; a *Lycopersicum*, with pubescent fruit; *gen. Sucæda-like*, a low shrub, with linear and very tender leaves; a *Nothites*, also a shrub; a hoary *Atriplex?*; a *Talinum?*; *gen. Compos.* with corymbose, yellow flowers; a procumbent *Oenothera*; and a softly-pubescent, blue-flowered *Evolvulus*. Yet so decidedly Desert is the character of the country, that places can readily be selected, where one may walk a mile without passing a single plant.

An exceptional locality exists in the neighborhood of Lima; the Amancaes mountain-ridge, "nearly three thousand feet high," facing the South wind coming from the sea, and deriving in consequence more than the usual supply of moisture. On looking up, I was surprised to perceive patches of green along the brow of this mountain-ridge, at the heads of the ravines; found, on ascending, to be beds of a species of *Bromelia:* an entire leaved *Carica*, was here frequent, a tree according to the stoutness of its trunk and branches, though only five to eight feet high; and the clefts of the rocks contained two species of *Peperomia*.—These ravines are further remarkable for putting forth a growth of plants annually; the sun in the "winter" season acting with somewhat diminished power on the supply of moisture. The commencement was observed on the 3d of June; when the low, red stems and white flowers of a *Begonia* making their appearance before the leaves, presented a striking vernal aspect; each cluster, however, having for a root a wide and flattened underground woody cake: a small tuberous-rooted species of *Oxalis* was also beginning to show itself.—On the 10th of June, the *Begonia* was in full flower: and a single "Amancaes lily," *Ismene amancaes*, was met

with; arising from a bulb deeply buried among fragments of rock, that along their surface conduct the moisture downwards.*—On the 2d of July, the "Amancaes lily" had become abundant; the two species of *Oxalis*, the yellow-flowered one and the purple-flowered one, were now fully developed; and a variety of other plants had sprung up: as, a second species of *Begonia;* a *Valeriana*, with pinnatisect leaves; two species of *Alstrœmeria;* a *Geranium*, having a large, thick, woody root; and a *Commelina:* also several plants that appeared to be annual-rooted; as an *Erigeron*, the *Nierembergia*, an upright *Gnaphalium*, a *Loasa?*, and an *Oenothera*. Some of the above plants being not yet in flower, gave evidence, that the height of the season would be some weeks later.

In journeying inland towards the Andes, the country continued Desert, with the plants as thinly scattered as in the neighborhood of the Pacific; but there was a very general change in species, those of the coast district ceasing, and in their place, others now making their appearance: as *Tiquilia dichotoma;* a *Loasa?*, having rather large cream-colored flowers; an *Arabis?;* a lanate *Encelia;* a dioecious, thick-stemmed *shrub*, bearing a trialate capsule of three samaras; *Croton? urens*, also a thick-stemmed shrub; a prostrate, many-stemmed *Convolvulus*, with its numerous flowers secund; a *Monnina;* and a viscous procumbent *Pomaria?*.—Nearer to the Andes, *Cacti* became more abundant, making their appearance in a variety of novel and strange shapes. The *Tillandsia-beds*, the principal growth of the Peruvian Desert, occurred more and more frequently until they became confluent; when the country presented an extraordinary spectacle; mountain and valley, in every direction and as far as the eye could reach, being of one uniform tint of grey, from the uninterrupted dense coating of Tillandsias. An *Aloe* now made its appearance; the only American representative of the tribe, and though yellow-flowered, presenting unexpected analogy with the African Continent.

Character and Composition of the Vegetable Growth. In a general view, comprising both Desert upland and infiltrated lowland, there appeared to be nine prevailing families of plants in Lower Peru; occurring in the following order of frequency:

* In further illustration of this increased moisture under the peculiar local circumstances; young stocks of the *pomegranate*, common *fig*, and *pacai-bean* or Inga, were observed to have sprung up from seeds accidentally scattered, and to have established themselves in the principal Amancaes ravine.

1. *Bromeliaceæ.* From the frequency on the Desert upland of the above-described Tillandsia-beds.

2. *Lichens.* Of the same color as the Tillandsias, and growing chiefly intermingled with them, in beds upon the soil. In the latter circumstance, and in their profusion agreeing unexpectedly with the Lichen-covered districts of the extreme North.

3. *Compositæ.* Presenting a very considerable variety of genera and species; some growing on the Desert upland, and others in the infiltrated lowland.

4. *Cactaceæ.* Growing on the Desert upland; and more frequent, and the species more numerous, towards the base of the Andes.

5. *Graminaceæ.* Both reeds and grasses, with hardly a real exception, confined to the infiltrated lowland.

6. *Leguminosæ.* Consisting of shrubs, herbaceous vines, and of more humble plants; most of the species growing in the infiltrated lowland.

7. *Solanaceæ.* Occurring in much variety both of genera and species; and nearly equally divided as to locality, one portion growing on the Desert upland, the remainder in the infiltrated lowland.

8. *Malvaceæ.* Occurring also in some variety. *Sidas* and *Abutilons* frequent in the infiltrated lowland.

9. *Verbenaceæ.* The species belonging to four or five different genera; but chiefly or altogether confined to the infiltrated lowland.

Of remarkable plants, the three following deserve notice: *Wigandia urens*, ten to fifteen feet high, herbaceous, but having the habit of Hydrophyllum, and covered with coarse, stinging hairs; the *Malesherbia*, observed only at the Eastern margin of the Desert-region; and an ornamental, scarlet-flowered *Antirrhinum?*, rather frequent in the environs of Lima.

Amid the universal tameness of the vegetable growth, the most characteristic botanical feature seemed to be the frequency and variety of *Solanaceæ;* the species presenting nothing of the coarseness of the Brazilian and other Tropical Solanums, but from marked differences in habit and organic structure, probably belonging to several distinct genera. Another striking botanical feature consisted in the *Heliotropiums;* belonging to a peculiar tribe, eminently Peruvian, and several of the species becoming low shrubs.

The *Nolanaceæ* constituted a third botanical feature; characteristic,

though not exclusively Peruvian; being in common with, or extending into Chili, as already mentioned.

The following plants were found growing in the Peruvian Desert-region, between the sea at Callao, and the elevation of five thousand feet on the Andes; the Eastern or inland limit being well defined, and about six miles beyond Yaso:

Clematis (No. 14); like C. Virginiana. The leaflets cordate, mostly entire. In great profusion, mantling the canebrakes and other vegetable growth along the river-bed from Yanga to the mountain-region on the Andes.*

Argemone (Mexicana, bis No. 1 Brazil). The flowers yellow; the capsule prickly. From Callao to Yanga; where it was seen growing on the Desert upland; though perhaps not really indigenous.

Arabis? (No. 15); leaves amplexicaul, sagittate, denticulate; sepals caducous, obtuse; pod long. On the mountain-ridge between Caballeros and Yanga.

Monnina pterocarpa, Ruiz. & Pav.? (No. 2). Two to three feet high, with sparse branches and leaves; the leaves linear and short; the fruit winged. Growing on the Desert upland, around Lima and on the mountain-ridge between Caballeros and Yanga.

——— (No. 3); leaves broad; fruit pubescent, winged. Below Yaso.

(Malvastrum) Limense, (No. 1; nov. gen. of Gray); Malva of authors. Annual; leaves 3–5-lobed, and the lobes serrate; flowers small, blue; the segments of the outer calyx linear. On the exsiccated portions of river-beds, at Lima and at Caballeros.

Gossypium (No. 4). A thick-stemmed shrub, or a small tree, fifteen feet high; leaves five-lobed, pubescent beneath. A single stock, growing beyond Yanga; apparently indigenous.

Gen. Malvac. (No. 1). Leaves broad; calyx naked, five-cleft; flowers small, purple; stamens in a long column, anthers yellow; carpels five. Frequent in the environs of Lima.

Anoda? (No. 1); but the flowers small, white. Leaves; carpels about ten. In the vicinity of Callao; rare.

Sida (No. 23; compare Brazil, &c.); near S. spinosa. Suffruticose, two feet high; leaves cuneate at base, crenate. In the vicinity of Callao, and of Yanga.

——— (No. 24). Suffruticose; a foot high; corolla rotate, the petals being inequilateral at the apex. Frequent on the exsiccated portions of the river-bed of the Rimac at Lima.

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* In general, in the cultivated ground of Lower Peru, weeds did not appear to be very troublesome, nor in much variety.

Anona Cherimoya, (No. 4); leaves round-ovate. This celebrated fruit abundantly cultivated, (and seen in perfection only in Peru). According to Mr. Matthews, the plant is "native in ravines to the Northward."

——— (No. 5); the "guanabana." The fruit esteemed, and sold in the market.

Brassica oleracea, (bis Polynesian Groups, Auckland Island, Australia, Oregon, the United States, and No. 1 Europe). Cabbages for sale in the market; (and the plant also seen growing spontaneously, or naturalized).

——— (No. 25). Three to four feet high; and having broad, cordate leaves. On the exsiccated portions of the river-bed of the Rimac, below Lima.

———; perhaps a fourth species.

Abutilon (No. 9). Tomentose; leaves cordate, and acuminate; carpels about eight, acuminate. At Yaso, and elsewhere in Lower Peru.

———? (No. 10). Closely tomentose; leaves petioled, broad-ovate; flowers axillary, glomerate; carpels eleven, acuminate. At Yaso, and elsewhere in Lower Peru.

Byttneria (No. 1). A shrub, three to six feet high, with the stem prickly. From Lima to the Andes.

Waltheria (compare Brazil, and No. 1 Hawaiian and Feejee Islands, and Zanzibar). A shrub, one to four feet high, weak, spreading, many-stemmed; closely tomentose. Frequent in the drier portion of the infiltrated ground around Callao and Lima.

———? (No. 3); or perhaps Sida; compare Obrajillo sp. Leaves petioled, broad-ovate, closely tomentose; flowers axillary, crowded. In the vicinity of Yaso.

Triumfetta (No. 4). Three to five feet high; leaves tomentose, broad. Between Yanga and Yaso; somewhat rare.

(Juliania huaucui, Gray; No. 1); gen. incert. A shrub, three to five feet high, having thick stems, and but few branches; no leaves; diœcious; the male flowers panicled, and very small; the fruit of three maple-like samaras. In the vicinity of Yaso; growing on the Desert upland.

Cardiospermum (No. 2); compare Obrajillo sp. Procumbent, many-stemmed; flowers white, and rather large. On the Northern prolongation of the Amancaes mountain-ridge.

Dodonæa (compare No. 1 Metia to the East Indies, Oman, Yemen, Zanzibar, and Brazil). A shrub, five feet high. A single stock met with; growing beyond Yaso, on the basal portion of the Andes.

Cissus compressicaulis, (No. 36); pubescent. In the infiltrated ground around Lima, but chiefly abounding in the vicinity of Callao.

Geranium (No. 13). Stemless, with a thick, woody root, and having much of the habit of some alpine species; pilose; leaves reniform, incised; flowers not seen. On the summit of the Island of San Lorenzo, and of the Amancaes mountain-ridge; making its appearance in the middle of June.

——— (rapa; bis Polynesian Groups, New Zealand, Australia, the United States, and No. 2 Europe). Turnips, a variety with the root fusiform, abundant in the market.

Raphanus sativus, (bis Dekkan, Zanzibar, Yemen, Egypt, Europe, and the United States). Radishes abundant in the market.

Bixa Orellana, (bis Hawaiian Islands, East Indies, Hindostan, Zanzibar, and No. 1 Brazil) Arnotto brought to market in large quantities; and apparently much used.

(Chorisia? No. 2); gen. Bombac. A tree, thirty feet high; the trunk slightly swelling in the middle, and covered with a few short thorns; the flowers white. Planted in a garden; brought probably either from the North, or from beyond the Andes.

Citrus aurantium, (bis Polynesian Groups, East Indies, Zanzibar, Egypt, and Brazil). Oranges in great abundance in the market.

——— (acida; bis Taheiti, Samoa, Feejee Islands, and Mocha); the lemon. The fruit for sale in the market. The rough-skinned variety, called in our greenhouses the "citron," also observed in market.

Tropæolum (No. 2); leaves puberulous, entirish; flowers large, with a long spur. Growing along the canals of irrigation in the environs of Callao and Lima; perhaps not indigenous in this part of Peru.

Oxalis (No. 27); root tuberous; flowers umbellate, pale purple. On the Amancaes mountain-heights; and in full flower on the 2d of July.

——— (No. 28); leaves small, obcordate; flowers yellow. At Yanga, and elsewhere in Lower Peru.

——— (No. 29); root tuberous; sepals broad at base; corolla at first red, afterwards becoming yellow. On the Amancaes mountain-heights; and in full flower on the 2d of July.

Gen. Zygophyllac. (No. 1). Appressed to the ground; the flowers small; carpels five. In the vicinity of Yanga, growing on the Desert upland.

Colletia? (No. 4). Green-barked twigs, with opposite spines; leaves entirish; flowers not seen. Below Yaso; somewhat rare.

Schinus molle, (No. 1). A shrub or small tree, ten to twenty feet high. Rare in the environs of Lima; abounding from Yanga to Yaso, on the infiltrated ground along the river-bed.

Crotalaria (No. 27). Leaves trifoliolate; flowers yellow; pod hairy. On the exsiccated portions of the river-bed of the Rimac, near its mouth.

Indigofera (No. 25). A branching shrub, four to six feet high; the flowers red. On the exsiccated portions of the river-bed of the Rimac, near its mouth.

Vicia (No. 6). Like V. parviflora? of Florida. A foot high; and having small blue flowers. In the vicinity of Callao; among grass in the drier portion of the infiltrated ground; rare.

Desmodium (No. 38); large purple flowers. In the vicinity of Callao.

——— (No. 39); softly pubescent; flowers very small, green and purple; pod three-jointed. In the vicinity of "Callao," Brackenridge.

——— (No. 40); more hairy. In the vicinity of Lima.

Phaseolus Truxillensis? (No. 11); leaflets broad; large rose-colored flowers; pod compressed. In the vicinity of Callao, growing near the sea-shore.

———? "vestitus," according to Matthews; (No. 12). Leaflets obovate, the margin undulated; flowers blackish-purple; pod pubescent. In the vicinity of Callao; growing in the infiltrated ground.

Malpighia Armeniaca? (No. 1). A spreading tree, thirty feet high. Planted in a garden at Lima; brought probably either from the North, or from beyond the Andes.

Vitis vinifera, (bis Yemen, Zanzibar, Rio Janeiro, and Europe). Seen under cultivation, and to all appearance in flourishing condition; wine manufactured, and of good quality; but chiefly used for the distillation of a colorless ardent spirit called "pisco," which is brought in vast quantities from other parts of the coast.

Spondias (No. 2). The plum-like fruit abundant in market on our first arrival; but lasted a short time only.

Juglans regia, (bis Australia, Chili, our Middle States, the Mediterranean countries, and No. 1 Northern Asia); the walnut. Planted in gardens.

Cicer arietinum, (bis our Middle States, Dekkan, Egypt, and No. 1 Europe). Chick-peas for sale in the market.

———? (No. 13); perhaps a second species; agreeing in the dark-purple flowers, but the peduncle very long; leaflets two-thirds of an inch in length, subrotund, smoothish. On the exsiccated portions of the river-bed of the Rimac at Lima.

Dolichos glycinoides? (No. 4); flowers yellow, as in D. luteolus; pod hairy. Abounding among grasses and bushes, in the infiltrated ground around Callao and Lima.

(Coulteria?, No. 1); Poinciana spinosa, and "tara" of Feuillée, 39. A shrub, ten to twenty feet high, having a forest or grove-like aspect. From Lima to the Andes.

Pomaria? (No. 1). Viscous and procumbent; stems slender; leaves ternato-pinnate, the leaflets in about eight pairs; flowers large, yellow; the calyx-teeth equal; the pod compressed, setose. On the mountain-ridge between Caballeros and Yanga.

(Cæsalpinia? No. 4); gen. Legum. A shrub, fifteen feet high; panicles of yellow, Cassia-like flowers. A single stock, growing between Yanga and Yaso.

Cassia (No. 26); near C. Marylandica. Six to eight feet high; pubescent all over; the pod also pubescent. Below Yaso; rare.

(Chamæcrista, No. 6); Cassia of authors. Near our C. chamæcrista. In the vicinity of Callao.

Mimosa? (No. 14). A branching shrub, three to five feet high; leaves conjugato-bijugis, Bauhinia-like; flowers purple and ornamental. On the exsiccated portions of the river-bed of the Rimac, near its mouth.

(Neptunia?, No. 3). Prostrate; the flowers yellow; the pod not articulate. In the vicinity of Callao.

Acacia (No. 42). A shrub, twelve feet high, having the outline of a spreading tree; long thorns; flowers yellow; the pod pubescent. In the infiltrated ground around Callao and Lima.

Lythrum maritimum, Kunth; (compare No. 1 Hawaiian Islands); like Chilian sp. Flowers of medium size, purple. Vicinity of Callao, and on the exsiccated portions of the river-bed of the Rimac at Lima.

Ammania (No. 6). Annual; a foot high; leaves amplexicaul, auriculate. On the exsiccated portions of the "river-bed" of the Rimac "near Callao," Brackenridge.

Jussiæa (bis No 11 Chili); five petals. Aquatic; growing in the vicinity of Callao.

——— (No. 13). Large, six to ten feet high; hairy; petals four. Abounding in wet ground, from Callao to beyond Yanga.

——— (No. 14); three to six feet high; the flowers smaller; the capsule more elongate. Frequent in the infiltrated ground around Callao and Lima.

Oenothera prostrata, Ruiz & Pav. (No. 17). Prostrate; the leaves dentate; the capsule sessile. On the Amancaes mountain-heights; making its appearance in the middle of June.

——— (No. 18). Annual?; capsule tetragonal, attenuate at base, short-pedicelled. On the Northern continuation of the Amancaes mountain-heights; rare.

Spartium junceum, (bis No. 2 Europe); the pod hairy. Abundantly naturalized from Callao to the mountain-region on the Andes; and it was said, "all over Peru."

Phaseolus (lunatus; No. 14; bis United States). "Lima" beans abundant in the market. (The species probably American, and of aboriginal cultivation).

Bauhinia (No. 9). A shrub, ten feet high; with short thorns; flowers not seen. A single stock, growing near a house three miles above Lima; possibly indigenous.

Passiflora (No. 13); pubescent, glutinous; the calyx pinnatisect. Frequent in the infiltrated ground around Callao and Lima.

——— (No. 14); leaves trifid; the flowers small. Environs of Callao and Lima; growing in the infiltrated ground.

Malesherbia thyrsiflora, (No. 1); two to four feet high. Growing beyond Yaso, at the Eastern margin of the Desert-region.

Carica (No. 3). Only six to ten feet high, but a real tree, with the trunk a foot in diameter, dividing into a few stout spreading branches; leaves entire, the under surface white. In the ravines of the Amancaes mountain-ridge.

Loasa? (No. 6). Annual; and the young shoots only met with. On the Amancaes mountain-heights; making its appearance in the middle of June.

———? (No. 7); leaves broad, dentate; flowers rather large, cream-colored. Growing on the Desert upland; around Lima, and on the mountain-ridge between Caballeros and Yanga.

——— (No. 8); flowers orange-colored. Frequent from near Yaso to the mountain-region on the Andes.

Talinum? (No. 7). Three or four inches high; leaves alternate, lanceolate, obtuse. Below Yaso.

Calandrinia? (No. 2). Leaves opposite?, succulent, linear; flowers not seen. Growing on the island of San Lorenzo.

Sesuvium portulacastrum, (compare No. 2 of our Atlantic States). The flowers sessile. Maritime; growing on the inland slope of the sea-beach.

"Melocactus" (No. 2). In the vicinity of Yanga; and again making its appearance half way to Yaso.

Cereus (No. 8). Bristly; two to three feet high, the branches upright, and about two inches in diameter; flower yellowish-green; the tube of medium length. In the environs of Lima; growing on the Desert upland, but covered with lichens, and hardly distinguishable in color from the soil.

——— (No. 9). Smaller; bristly, procumbent, fascicled, the branches about an inch in diameter; flowers scarlet; the tube rather long. Frequent in the environs of Lima; growing on the Desert upland, but covered with lichens, and not readily distinguished in color from the soil. Figured by Mr. Agate.

——— (No. 10); less bristly than No. 8. Three feet high; the stem polygonal, or many-angled, and three inches in diameter. In the vicinity of Yanga, growing on the Desert upland.

——— (No. 11); somewhat resembling No. 7 Chili. When upright, four to five feet high; but when projecting over precipitous rocks, pendulous and very long; stem four inches in diameter, with ten or twelve angles. Frequent from about three miles below Yaso to the mountain-region on the Andes.

(Desmanthus depressus? No. 2); gen. Mimos. Herbaceous?, two feet high; flowers inconspicuous; pods fasciculate, linear. A weed in gardens at Lima.

Inga Sinemariensis? (No. 11); the "pacai." A tree forty feet high; leaves abruptly pinnate, the petiole winged. Planted in gardens; the pods sold in great quantities in the market, but as an esculent, requiring, perhaps, a cultivated taste. A single stock, from a seed accidentally scattered, flourishing in the principal Amancaes ravine.

——— (No. 12). Woolly; the hairs and thorns white; stem three to six feet high, simple, or sometimes branching, the branches few; inflorescence secund. From Yanga to the Andes.

———? (No. 13); compare Opuntia. One to two feet high, upright, and sometimes branching at the summit; showy scarlet flowers. Between Yanga and Yaso.

Opuntia? (No. 10). Six to eight inches high; clustered; the stem-joints ovoid, easily detached; flowers not seen. Between Yanga and Yaso.

——— (No. 11). Similar in habit and size; flowers bright-yellow, lasting several days, the tube short. At the inland base of the Amancaes mountain-ridge; rare. Figured by Mr. Agate.

———? (No. 12). Upright, branching, five to ten feet high; stem eight or ten inches diameter, usually tetragonal, but sometimes with six angles; the flowers small, purple, disposed upon the projecting angles. Met with from the vicinity of Caballeros to the Andes.

Hydrocotyle (No. 21; compare No. 19 Chili). Like H. ranunculoides. On the banks of an irrigating canal, passing through the streets of Lima.

——— multiflora, Ruiz & Pav. (No. 22). Almost subaquatic; the leaves large, mistaken in the distance for those of a Nymphæa. In the drowned land at the mouth of the Rimac.

Spermacoce? (No. 4). Leaves lanceolate-ovate, attenuate at base; flowers congested. In the vicinity of Callao.

(Rubia?; compare No. 3 Chili. Recorded as) Galium?. Leaves verticillate in fours; calyx very large; the fruit orange-colored, and hairy. In the environs of Callao.

(———? No. 4. Recorded as) Galium. Smaller; leaves verticillate in fours, linear. On the Amancaes mountain-heights.

Valeriana (No. 7). A foot high; leaves all pinnatisect, the lobes dentate. On the Amancaes mountain-heights; making its appearance in the middle of June.

Gen. Sonchus-like (No. 2); compare Patagonia. Scorzonera-like; leaves lanceolate, entire; smooth; calyx-scales about ten, in a single series; flowers white; the pappus pedicelled. Growing along the banks of the irrigating canals around Callao.

Dumerilia (No. 1). From below Yaso to the mountain-region on the Andes.

Piqueria artemisioides? (No. 1). Having the habit of Solidago; leaves opposite, dentate; calyx-scales in a single series; flowers consisting of five or six florets. On the Amancaes mountain-heights, and elsewhere on the Desert upland.

——— (No. 2); perhaps a second species; the leaves entire, obtuse. Between Yanga and Yaso.

Phalacræa latifolia? (No. 1); "manga paki" of Feuillée, 36. Annual?; Ageratum-like; a foot high; the flowers blue. In the environs of Callao and Lima.

Nothites? (No. 2). A shrub, one to two feet high; the flowers corymbose, whitish. In the environs of Lima; growing on the Desert-upland.

Mikania (No. 8). Smooth; the flowers slender, consisting of three to five florets. Frequent in infiltrated ground, from Callao to the Andes.

Cydonia vulgaris, (bis Yemen, Brazil, Chili, United States, and No. 1 Europe). Quinces for sale in the market.

Malus sylvestris, (bis Yemen, Brazil, United States, and No. 1 Europe). Apples of several varieties abundant in the market, and superior in quality to those of Chili.

Gen. Compos. (No. 1). Having the habit of Zapania; prostrate; leaves opposite, entire, obtuse; calyx-scales about eight, in a single series; flowers purple, rayless. Maritime; growing abundantly on the inland slope of the sea-beach.

Gen. Eupatorioid? (No. 1). Having the habit of Solidago; leaves a fourth of an inch long, dentate like those of Baccharis, or in some instances roundish; calyx-scales in two to three series; pappus-rays about forty. Between Yanga and Yaso.

Tripolium (No. 11; compare Hawaiian Islands). Near T. subulatum; floret-rays short. In the environs of Callao and Lima; growing in the infiltrated ground.

(Cænotus No. 11). Like C. Canadensis, but the flowers larger; leaves linear-lanceolate. In the environs of Callao.

Erigeron (No. 15). Annual?; pubescent; leaves numerous, crowded, half an inch long, entirish, attenuate at base; flowers small, white. On the summit of the Island of San Lorenzo, "twelve hundred feet" in elevation, and on the Amancaes mountain-heights; making its appearance in the middle of June.

Gen. Compos. (No. 1). A shrub, two to four feet high; leaves opposite, entire; inflorescence corymbose; calyx-scales about five, in a single series; floret-rays few, short, yellow. On the Amancaes mountain-ridge, and elsewhere on the Desert upland.

——— (No. 2); perhaps a second species; tomentose. In the vicinity of Yanga.

Baccharis? (No. 24); "chilca" of Feuillée, 37. A shrub, six to eight feet high, and having but few branches; inflorescence terminal, corymbose. Abounding on the exsiccated portions of the river-bed of the Rimac, from Lima to its mouth.

———; perhaps a second species.

Pluchea? (No. 7). Suffruticose, branching, two to three feet high; leaves tomentose, penninerved, broad, dentate, two-thirds of an inch in length; calyx-scales in about three series. Between Yanga and Yaso.

Tessaria legitima, (No. 1). A shrub, ten to fifteen feet high. In great profusion in the inundated ground at the mouth of the Rimac.

Gnaphalium (No. 50). One to two feet high; lanate; the flowers congested. In the infiltrated ground in the vicinity of Callao.

——— (No. 51); perhaps distinct from the preceding. One to two feet high; leaves amplexicaul, broad at base, gradually tapering to a point. On the exsiccated portions of the river-bed of the Rimac at Lima.

——— (No. 52). Annual; upright, three to eight inches high; leaves undulated. Frequent on the Amancaes mountain-heights; making its appearance in the middle of June.

Flaveria contrayerva, (No. 1). Herbaceous, one to two feet high. Frequent in the coast district, in the infiltrated ground around Callao and Lima.

(Enhydra) maritima, (No. 1); Meyera of authors. Tenderly herbaceous, one to two feet high; flowers rayless; four calyx-scales. Subaquatic; abounding in the inundated ground at the mouth of the Rimac; but not properly maritime.

Punica granatum, (bis Mediterranean countries, Hindostan, Zanzibar, and No. 1 Yemen). Pomegranates for sale in the market. Some young trees springing up from seeds accidentally scattered in the principal Amancaes ravine.

Psidium guayava, (bis East Indies, Hindostan, Zanzibar, and No. 4 Brazil); the guava. The fruit abundant in the market.

Senecio? (No. 35). Leaves succulent, bipinnatisect; the flowers not seen. On the island of San Lorenzo.

Gen. Compos.? (No. 1). Leaves alternate, somewhat Salvia-like, broad, rugose; the flowers not seen. On the "summit of the island of San Lorenzo," Lieut. Case.

(Philoglossa Peruviana?; No. 1); gen. Senecioid?. Ornamental; scandent, and having the habit of Mikania; flowers inclining to orange, the florets five-cleft. Back of Bella Vista; rare.

Polymnia? (No. 2). A shrub, twelve to eighteen feet high; leaves opposite, attenuate, amplexicaul, auriculate at base; five broad foliaceous calyx-scales; floret-rays short, yellow. From near Yaso to the mountain-region on the Andes.

Heliopsis? (No. 2). One to two feet high; the leaves opposite. In moist places in the environs of Lima.

Encelia canescens, (No. 1). A shrub, three to five feet high. Frequent in the infiltrated ground around Lima, and throughout the coast district.

——— sp. nov. (No. 2); leaves longer and narrower; the pubescence very close. From below Yanga to the mountain-region on the Andes.

——— sp. nov. (No. 3); leaves lanate and white, Phlomis-like. In the vicinity of Yanga; growing on the Desert upland.

Bidens Abadiæ, Dec.? (No. 14; compare No. 13 Chili; and also the next species). Leaves sometimes three-parted, but mostly ovate and simple; floret-rays white. In the environs of Lima.

——— (No. 15); hirtellous; the lower leaves three-parted; flowers yellow, rayless. In the vicinity of Callao.

———; perhaps another species.

Spilanthes (No. 3). In the environs of Lima; subaquatic.

———; perhaps a second species.

Galinsoga (No. 2; compare Chili). In the environs of Lima.

Melampodium? (No. 1). Annual?; one to two feet high, branching. Growing in old abandoned fields back of Pachicamac, C. P.

Ambrosia Peruviana? (No. 8); the flowers small. In the environs of Callao and Lima.

Lobelia (No. 54). Herbaceous, upright, leafy, two to three feet high; leaves with sharp serratures; a long, terminal, leafy raceme of blue flowers, each flower an inch and a half long. Growing along the river, above Yaso, on the basal portion of the Andes.

Samolus floribundus, Kunth? (No. 2). In the environs of Callao and Lima.

Passiflora (No. 15); the "grenadilla." The fruit excellent, and abundant in the market.

Lagenaria vulgaris, (bis Polynesian Groups, East Indies, Equatorial Africa, Egypt, and the other Mediterranean countries). The "bonnet gourd" abundant in the market; together with a peculiar, small-fruited variety, of which various utensils are made. (This small-fruited variety of Aboriginal cultivation).

Cucurbita pepo, (bis Chili, and compare No. 2 North America). A large-fruited variety, distinct from all our North American kinds, frequent in market; and esteemed for the table.

Portulaca oleracea, (bis United States, Hawaiian Islands, Taheiti, Tongataboo, and Muscat); purslane. Sought for in vain in Chili; and in Peru, seen only in the cultivated state; bundles being offered for sale in the market.

Manglilla Jussieui, (No. 2). A shrub, ten to fifteen feet high. In great profusion in the inundated ground at the mouth of the Rimac.

(Sarcostemma Dombeyanum?; No. 3); gen. Cynanchoid. A long, prostrate vine; leaves lanceolate-ovate; fruit woolly. On the exsiccated portions of the river-bed of the Rimac, from Lima to its mouth.

Tecoma sambucifolia, K.? (No. 3). A shrub, five to twenty feet high; in foliage much like a rose; the flowers yellow. Frequent in the infiltrated ground along the river, from Yanga to the Andes.

Wigandia urens, (No. 1); entirely agreeing in habit with the Hydrophylleæ. Upright, coarsely herbaceous, ten to fifteen feet high; covered with stinging hairs. Seen in the environs of Lima, and again at the base of the Andes; rare.

Aldea pinnata, Ruiz & Pav. (bis No. 2 Chili and the Chilian Andes, and compare No. 1 Oregon and California). From Yaso to the mountain-region on the Andes.

(Pharbitis?, No. 4; gen.) Convolv. Leaves petioled, cordate; calyx hairy. In the environs of Lima.

(Jaquemontia?, No. 2; gen.) Convolv. Prostrate, many-stemmed; leaves secund, repandly-dentate; peduncles twisted to opposite the leaves. In the vicinity of Yanga; growing on the Desert upland.

(———? No. 3). Prostrate, many-stemmed; leaves plicate; flowers secund, white; segments of the corolla acuminate. At Bella Vista, and on the Amancaes mountain-heights.

Cressa Truxillensis, (compare No. 1 Hawaiian Islands, California, and Patagonia). Maritime; frequent on the inland slope of the sea-beach.

Evolvulus (No. 5). Procumbent; the flowers white. Abounding on the inland slope of the sea-beach.

——— (No. 6). Procumbent, covered with white, soft pubescence; the flowers blue. On the Amancaes mountain-heights, and elsewhere on the Desert upland.

(Calyptraria) rotundifolia, (No. 1); Cordia of Ruiz & Pav. A shrub, ten to fifteen feet high. Beyond Yanga.

Varronia? (No. 2). A shrub three to five feet high; flowers capitate. Between Yanga and Yaso.

———? (No. 3); flowers capitate, smaller than in the preceding species. Beyond Yaso, at the commencement of the mountain-region on the Andes.

Tiquilia dichotoma, (No. 2); prostrate. Between Caballeros and Yanga; growing on the Desert upland.

Petroselinum sativum, (bis Oregon, our Atlantic States, and No. 1 Europe). Parsley for sale in the market.

Daucus carota, (bis Brazil, Oregon, our Atlantic States, Egypt, and No. 1 Europe). Carrots for sale in the market.

Lactuca sativa, (bis United States, Egypt, and No. 1 Europe). Lettuce for sale in the market.

Eclipta (compare Feejee Islands to the East Indies, Hindostan, Zanzibar and Brazil). Frequent in wet places in the environs of Callao and Lima.

Tagetes? (No. 2). Two to three feet high, branching, strong-scented. Among garden rubbish at Lima.

Heliotropium Curassavicum? (bis Hawaiian Islands, and No. 8 California, Interior Oregon, sea-coast of Maryland, and Patagonia); glaucous. Maritime; growing on the inland slope of the sea-beach.

——— ? (No. 9). Upright, six to twelve inches high; leaves ovate, plicate, strigose; flowers white. Frequent in the infiltrated ground around Callao.

——— (No. 10); leaves broad-lanceolate, subserrate; flowers rather large, blue. On the Amancaes mountain-heights.

——— (No. 11). A shrub, two to three feet high; leaves pubescent, ovate; flowers white. On the Amancaes mountain-heights.

——— (No. 12). Strigose; spikes solitary, or in pairs; flowers small. Between Yanga and Yaso.

——— ? (No. 13). Strigose; leaves sessile, lanceolate. On an eminence beyond the Amancaes mountain-heights, once only met with.

Gen. Nolanac.? (No. 1). A spiny shrub, six to eight feet high, having the habit of Lycium; leaves tenderly herbaceous, smooth, glaucous, entire; five long calyx-teeth; flowers white, the stamens inserted on the corolla; carpels four. Between Yanga and Yaso.

Nolana prostrata, (No. 1); petioles ciliate; corolla blue, with a central darker spot. Maritime; growing on the inland slope of the sea-beach.

——— (No. 2); leaves narrower, the petiole not ciliate; calyx sometimes two-parted. On the summit of the Amancaes mountain-ridge.

Gen. Solanac.? (No. 1). Herbaceous, rank-growing, procumbent; leaves Datura-like, and thickened or succulent; five calyx-teeth; flowers large, blue. In the vicinity of Caballeros.

Cestrum auriculatum? (No. 5). A shrub, eight to twelve feet high. Frequent in the infiltrated ground around Callao and Lima.

Nierembergia? (No. 1). Annual; the flowers blue. On the summit of the Amancaes mountain-ridge; making its appearance in the middle of June.

Nicotiana (No. 8). Glutinous; flowers reddish, short, spreading; the corolla unequal. From Lima to Yanga, and elsewhere on the Desert upland.

——— paniculata, Ruiz & Pav. (No. 9). Slightly canescent; leaves large, cabbage-like; long slender flowers. From Lima to Caballeros.

Physalis (Peruviana?; compare No. 7 Chili). Softly pubescent; three to five feet high. Growing on the exsiccated portions of the river-bed of the Rimac, at Lima.—Cherry-tomatoes (or Cape-gooseberries, bis Hawaiian Islands and Taheiti to Feejee Islands and New Zealand), for sale in the market.

(Lucuma obovata; No. 2); Achras of Ruiz and Pav. Cultivated; the fruit sold in the market, and called "lucuma;" but though rich-flavored, sweet, and apparently wholesome, it did not seem to be a general favorite. Mr. Matthews informed me, that the tree is "native in ravines to the Northward."

Olea Europæa, (bis Mediterranean Countries, Chili, and Hindostan). The tree not met with; but fresh olives were abundant in the market; the best were said to be "brought from the Northward."

Batatas edulis, (bis Metia to Feejee Islands, the East Indies, New Zealand, and Brazil). The roots abundant in the market, and of good quality; (but all of one variety, yellow internally, and altogether like our own).

——— (No. 8). Smooth; leaves lanceolate, dentate; the flowers small. Growing in the environs of Callao.

Lycopersicum (No. 1); closely pubescent; the fruit smooth. In the environs of Callao.

——— (No. 2); the fruit pubescent. In the environs of Lima; growing on the Desert upland.

——— (No. 3); perhaps not distinct from the last; pubescent; the flowers solitary. In the vicinity of Yanga.

Lycium? aggregatum, (No. 8). A many-stemmed shrub, eight to twelve feet high; the flowers white. In the environs of Lima; growing in the infiltrated ground.

——— (No. 9). Normal; and having short thorns; the leaves slightly hairy. In the environs of Lima; rare.

Calceolaria pinnata, (No. 9). In wet places along the river-bed of the Rimac at Lima.

Gen. near Antirrhinum (No. 1). Ornamental; the flowers scarlet, the corolla gibbous beneath at base. In the environs of Lima, and of Caballeros.

Herpestis (compare No. 1 Hawaiian Islands, and Interior Hindostan). From the environs of Callao to the mountain-region on the Andes.

Capraria Peruviana, (compare No. 1 Brazil), and C. biflora. On the exsiccated portions of the river-bed of the Rimac, at Lima.

Scoparia dulcis, (compare Manilla, and No. 1 Brazil). On the exsiccated portions of the river-bed of the Rimac, at Lima.

Buddleia Occidentalis, (No. 4). A shrub, eight to twelve feet high. In the environs of Lima and elsewhere, growing in the infiltrated ground.

Peltodon (No. 2); a congener of Brazilian sp. Pubescent, glutinous, one to two feet high. On the basal portion of the Andes, growing in company with the Wigandia; rare.

Convolvulus arvensis? (compare our Atlantic States, and No. 2 Dekkan and Europe). In the environs of Lima.

Nicotiana tabacum, (bis Polynesian Groups, East Indies, Brazil, and No. 6 North America). Tobacco much used for smoking, but the plant not seen under cultivation.

Datura stramonium, (compare Hawaiian Islands, our Atlantic States, and Chili). Growing spontaneously, but apparently only naturalized. (Probably introduced by Aboriginal settlers).

Nicandra physalodes, (No. 1; bis St. Helena, and our Atlantic States). Frequent in waste ground in the outskirts of Lima.

Capsicum frutescens, (No. 4; bis Polynesian Groups, East Indies, Hindostan, and Zanzibar). The fruit much used.

Solanum melongena, (bis East Indies, Hindostan, Zanzibar, Mocha, and Egypt); the egg-plant. The fruit abundant in the market, but inferior in size and quality to that of our Middle States.

——— nigrum? (compare Polynesian Groups to New Zealand and the Thebaid, and No. 28 California and Chili). In the environs of Callao.

——— tuberosum, (No. 56; bis New Zealand, Singapore, Hindostan, Zanzibar, and the United States). Potatoes abundant in the market; including the celebrated yellow variety, called "papas amarillas;" the latter perhaps brought from the Andes.

Hyptis spicata? (compare Mindanao, and No. 2 Brazil). Four to six feet high; pubescent; the leaves crenately dentate. On the exsiccated portions of the river-bed of the Rimac at Lima, and in infiltrated ground elsewhere.

Salvia (No. 9). From below Yaso to the mountain-region on the Andes.

Zapania canescens, Kunth; (No. 3). Abounding in the infiltrated ground around Callao.

Lippia? (No. 1). A weak-stemmed shrub, one to two feet high, having the habit of Lantana; leaves papillif., hirsute. In the environs of Callao.

Lantana (No. 10). One of the most ornamental of the known species; a shrub, six to ten feet high; densely hirsute; capit. of flowers three-colored, orange, red, and . . . . Frequent on the exsiccated portions of the river-bed of the Rimac, from Lima to its mouth.

Verbena (No. 17). Two to four feet high; leaves cuneate, dentate. Frequent in the environs of Callao and Lima.

Ruellia (No. 13); having small white flowers. On the Northern prolongation of the Amancaes mountain-heights.

———? (No. 14); or compare Justicia. Pubescent, glutinous; having long scarlet flowers. In the vicinity of Yanga, growing on the Desert upland.

Justicia repens, Ruiz & Pav. (No. 36); broad, canescent leaves; long red flowers. In the environs of Lima, growing on the Desert upland.

Plumbago (No. 7); leaves amplexicaul at base, somewhat panduriform; flowers blue. On the Amancaes mountain-heights.

Boerhaavia hirsuta, Ruiz & Pav., non alior. (No. 13). Decumbent; pubescent; the flowers small. In the environs of Lima.

——— scandens, (No. 14). Stems long, weak, branching, spreading among bushes to height of six feet or more; flowers purple, a fourth of an inch in length. From Lima to the Andes.

Gen. Nyctagin? (No. 1). Leaves opposite, incano-pubescent, broad, curled; flowers not seen. On the sea-shore of the island of San Lorenzo.

Calymenia? (No. 1). Glutinous; the stem hairy; leaves opposite, entire, plicate, pointed, curled. In the vicinity of Yanga, growing on the Desert upland.

———? (No. 2); perhaps a second species. Prostrate; the leaves more obtuse; the fruit smaller. In the vicinity of Yanga.

Salicornia Peruviana, (No. 11). Maritime; forming extensive beds in the depressed ground back of the sea-beach.

Gen. Chenopod. (No. 5). A shrub, a foot high; leaves crowded, short, linear, succulent, and very tender; flowers axillary. On the island of San Lorenzo and around Lima, growing on the Desert upland.

Chenopodium (No. 12). Like C. rubrum, but the leaves crowded. On the summit of the Amancaes mountain-ridge.

Lycopersicum esculentum, (No. 4; bis Manilla, Oregon, and our Atlantic States). Tomatoes abundant in the market; the plant not seen wild.

Priva (No. 1; bis Brazil and Taheiti). In waste ground in the outskirts of Lima; naturalized.

Plantago major? (compare Western Oregon, our Atlantic States, New Zealand, Chili, and No. 14 Austria). In the vicinity of Caballeros. No specimens.

(Atriplex? No. 10). Canescent or hoary; the leaves broad. In the environs of Lima, growing on the Desert upland.

Batis (No. 1). Maritime; forming matted beds half an acre or so in extent, and from their yellowish-green color, conspicuous in the depressed ground back of the sea-beach.

Gomphrena? (No. 1); leaves obovate. In the environs of Callao.

——— (No. 2); the flowers more conspicuous, the corolla-glumes hairy. In the vicinity of Yanga.

Begonia (No. 6). Humble; the red stems and white flowers making their appearance before the leaves. On the Amancaes mountain-heights; springing up in the beginning of June, and having much of the aspect of a vernal plant.

——— (No. 7). The leaves Misandra-like, and making their appearance before the flowers; the flowers not seen. On the Amancaes mountain-heights, springing up at the same season with the preceding species.

Polygonum (compare Chili, Polynesian Islands, No. 4 New Zealand and Australia, and No. 16 California). Like P. mite and P. persicaria. In wet places, in the environs of Callao.

Euphorbia (compare United States, and No. 44 North Patagonia and Chili). Like E. maculata. In the vicinity of Yanga, growing on the Desert upland.

Nov. gen. urens, (No. 1); Croton of authors. A thick-stemmed shrub, having the habit of Jatropha; one to four feet high, with a few large branches; broad leaves, with prickle-like hairs. Between Yanga and Yaso, growing on the Desert upland.

Croton (No. 12). A shrub, two to three feet high; leaves narrower than in the mountain species to be mentioned presently. Between Yanga and Yaso.

Gen. Euphorbiac. (No. 1). A shrub, three to five feet high; leaves petioled, ovate, serrate; cymes axillary, peduncled; five calyx-teeth. On the basal portion of the Andes "beyond Yaso, growing in company with the Dodonæa," rare, Brackenridge.

Peperomia scutellæfolia, Ruiz & Pav. (No. 28). In clefts of rocks, on the Amancaes mountain-heights.

——— inequalifolia, Ruiz & Pav. (No. 29); leaves verticillate. In clefts of rocks, on the Amancaes mountain-heights.

Salix Humboldtiana, Willd. (No. 27). Thirty to fifty feet high, with the trunk two feet in diameter; being the only indigenous tree of Western Peru. Frequent in the infiltrated ground from Callao to the mountain-region on the Andes. A tall variety having coarctate branches, abundantly planted, and readily mistaken for Lombardy poplars in the landscape. The extreme fibrous roots, from their red color, conspicuous in all the fresh-water streams and irrigating canals of Lower Peru.

Mirabilis Jalapa, (No. 1; bis California, and our Northern gardens). In waste ground in the outskirts of Lima; naturalized.

Chenopodium. Bundles of the stems and leaves sold in the market, and eaten boiled as greens.

Rumex (No. 20). Like R. crispus; the valves nearly entire, all graniferous. In the vicinity of Callao, possibly indigenous.

Persea gratissima, (No. 3); the "avocado" pear. The fruit sold in the market.

Euphorbia hypericifolia? (compare Taheiti, Mindanao, Dekkan, and Zanzibar). A foot high; hairy. Frequent around Callao and Lima; possibly indigenous.

Lemna gibba? (compare No. 4 California and Chili). The frond very convex beneath; the flowers observed to have two stamens. Aquatic; and abundant in the vicinity of Callao.

Zannichellia (compare No. 1 Western Oregon). Aquatic; growing in the irrigating canals around Lima.

Ruppia maritima, (compare No. 1 Hawaiian and Feejee Islands, Australia, Western Oregon, and our Atlantic coast). Marine; growing in the salt-water pools at Callao Point.

Potamogeton striatum, Ruiz & Pav. (No. 16). Aquatic; growing in the irrigating canals around Callao.

Habenaria? (No. 15); a congener of H. quinqueseta?. One to two feet high; the flowers small, greenish. In wet ground, in the vicinity of Callao.

Canna (Indica?; compare Polynesian Groups, East Indies, and No. 1 Brazil); the flowers scarlet. In wet places near Lima; perhaps only naturalized. Not seen in the Interior.

Ismene Amancaes, (No. 1); the "Amancaes lily." The bulb deeply buried among fragments of rocks, that in their interstices retain moisture. Frequent on the Amancaes mountain-heights; making its appearance towards the middle of June, and observed in full flower on the 2d of July.

Gen. Amaryllid. (No. 1). The bulb smaller than in the preceding plant, and the stem apparently more slender; leaves lanceolate, elongate; the flowers not seen. On the Amancaes mountain-heights.

Alstroemeria (No. 4); leaves lanceolate, acute; the flowers not seen. On the Amancaes mountain-heights; making its appearance in the middle of June.

——— (No. 5); leaves attenuate at base, spatulate, somewhat obtuse; the flowers not seen. In the environs of Lima.

Aloe (No. 4); the Peruvian aloe. One to two feet high; the flowers yellow. From Yaso to the mountain-region on the Andes, growing in beds of limited extent on the Desert upland.

Pitcairnia? (No. 3); compare P. ferruginea. The leaves green on both sides, with the marginal prickles erect; a scape three to six feet high, bearing a panicle of flowers. Growing in beds, green and conspicuous along the brow of the Northern continuation of the Amancaes mountain-ridge. A kind of gum exudes from the old stems.

Ricinus communis, (bis Polynesian Groups to New Zealand, and No. 1 Hindostan and Zanzibar). Frequent around Callao and Lima; probably introduced.

Janipha manihot, (bis Zanzibar, and No. 1 Brazil); manioc or cassava. One of the principal objects of cultivation: the roots abundant in the market, and eaten boiled.

Ficus carica, (bis Brazil, Chili, the Mediterranean countries, and Hindostan); the common fig. The tree often planted in gardens; but the fruit not met with. Some young stocks springing up from seeds accidentally scattered in the principal Amancaes ravine.

Pistia stratiotes, (bis No. 1 East Indies, Hindostan, and Zanzibar). Seen only in the vicinity of Callao, where it is abundant.

Musa paradisica, (bis Polynesian Groups to Zanzibar, Egypt, and No. 1 East Indies). Bananas abundant in the market.

——— sapientum? (No. 4); the plantain. The fruit only met with. (Not seen out of America, in any of the countries I subsequently visited.)

Tillandsia purpurea, Ruiz & Pav. (No. 11). Six to ten inches high; a terminal cluster of three to six spikes, each containing eight or ten flowers. Growing in beds, on the Desert mountain-summits in the environs of Lima and Caballeros.—In one instance, Tillandsias were seen regularly planted; around the cross upon the ancient temple of Pachicamac.

——— (No. 12); larger than the preceding species. One to two feet high; spikes as many as twelve, each containing about eight flowers. Seen only on the island of San Lorenzo.

——— (No. 13); woolly; the leaves curled; the flowers pale. Forming extensive beds on the Desert upland around Caballeros.

——— (No. 14); leaves broad at base. Forming beds on the Desert upland around Caballeros.

Commelina (No. 18); sheaths ciliate on the margin; three stamens and two styles. In the infiltrated ground around Callao.

———? (No. 19); pubescent; the leaves rather large; the flowers not seen. On the "summit of the island of San Lorenzo," Lieut. Case.

Callisia (No. 1); the spathes perfectly smooth; the flowers very small. Frequent in the infiltrated ground around Callao and Lima.

Typha Truxillensis, (No. 6). Growing in extensive beds in the inundated ground at the mouth of the Rimac.

Fimbristylis (No. 15; compare No. 14 Brazil). One to two feet high; the leaves short. In the vicinity of Callao; submaritime?

Scirpus (compare No. 1 Hawaiian Islands, Oregon, California, Patagonia, and Chili); resembling S. lacustris, but the stem distinctly triquetrous. Upright; the inflorescence nearly terminal, the spikelets small. Subaquatic; growing in beds twelve feet high, in the drowned land at the mouth of the Rimac.

——— (No. 22). Allied to the preceding species, but the stem cylindrical, weak and slender, six to twelve feet long, trailing, penetrating among bushes, and forming tangled masses; from one to six sessile spikelets. In the drowned land at the mouth of the Rimac.

——— (No. 23); perhaps not distinct from the preceding species, but the stem triquetrous, and somewhat stouter. Frequent in the drowned land at the mouth of the Rimac.

——— (No. 24). Stem extremely slender, hardly larger than (the finest) knitting-needle, but six to twelve feet long, trailing, penetrating among bushes; the inflorescence not seen. In the environs of Lima.

Eleocharis (compare No. 1 Feejee Islands, New Zealand, and Australia). Four to six feet high, the stem articulate. In wet places, in the environs of Callao and Lima.

——— (No. 17; compare Feejee Islands, Manilla, and Bombay); like E. capitatus. Eight inches high. Growing in the environs of Callao.

Allium cepa, (bis United States, Hindostan, Egypt, and No. 1 Europe). Onions for sale in the market.

——— sativum, (bis Australia, United States, and No. 2 Europe). Garlic for sale in the market.

Ananas (bis Polynesian Islands, East Indies, and No. 1 Brazil). Pine-apples for sale in the market; but of inferior quality.

Cyperus articulatus? (No. 41). Leafless; the stem articulate, four to six feet high. Subaquatic; growing in the environs of Callao and Lima

——— (No. 42). Three to four inches high; and having two or three sessile spikelets. In the environs of Callao.

——— (No. 43). A foot high; the umbel compound; the spikelets of about twelve florets. In the environs of Callao.

——— (No. 44); near C. dentatus. One to four feet high; the spikelets compressed, consisting of from eighteen to twenty-four florets. In the environs of Callao.

Paspalum (No. 11); inflorescence in two long spikes; with the florets small. In the environs of Callao and Lima.

——— (No. 12). Six feet high; the leaves an inch wide; the spikes with four rows of florets. In the environs of Callao.

——— (No. 13). A foot high, pubescent; broad-leaved. In the environs of Callao.

——— (No. 14); near P. distichum; tufts of hairs at the mouth of the sheaths. Abundant back of the sea-beach.

Ceresia (No. 1). In the environs of Callao.

Panicum (No. 40); like P. virgatum. Three to five feet high, with a spreading panicle. In wet ground, in the environs of Lima.

(Sporobolus) Indicus? (compare No. 2 Singapore, Australia, St. Helena, and the mountains of Yemen). Maritime; growing on the inland slope of the sea-beach.

(———? No. 8; or compare) Agrostis. Panicle coarctate; glumes long, acuminate. In the vicinity of Callao; and perhaps the same species, at Lima.

Agrostis (? No. 35). Having much of the habit of the (Brizopyrum); and growing in company, in the depressed ground back of the sea-beach.

Deyeuxia? (No. 3). Six to ten feet high; the margin of the leaves serrated. Forming cane-brakes around Lima and Caballeros, and elsewhere in the infiltrated ground; the long, naked flower-stems, and flabellately-disposed leaves, imparting a peculiar aspect.

———? (No. 4); a larger species. Ten to twenty feet high; the margin of the leaves serrated; the florets larger, and more acuminate; the base of the corolla with long hairs. Forming cane-brakes; and especially, a principal portion of the extensive one around the mouth of the Rimac.—On the 16th of May, we passed a cane-brake on fire, on the road to Caballeros; and though at a great distance, we could hear the successive loud explosions produced by the bursting of the hollow joints.

Phragmites (compare No. 1 Italy, Oregon, California, our Atlantic States, Patagonia, and Chili). Six to twelve feet high. Exclusively occupying extensive tracts of the above-mentioned cane-brake, around the mouth of the Rimac and along the road to Lima.

———? (No. 2); larger than the preceding species. Ten to twenty-five feet high; not seen in flower. Forming cane-brakes in wet ground, from Lima to the Andes. The stems used for building purposes in the Interior; as those of Deyeuxia are at Callao.

Kyllingia (compare Polynesian Groups, East Indies, St. Helena, and Rio Janeiro). Growing along the margin of irrigating canals at Lima.

Zea mays, (No. 1; bis Mindanao, our Atlantic States, and Chili); Indian corn. (Of Aboriginal introduction; and at the present day), abundantly cultivated; but chiefly used for making a kind of beer, called "chicha."

Pennisetum cenchroides?. Growing in the environs of Callao.

Cynodon (compare No. 1 Taheiti to Tongataboo, New Zealand, Hindostan, the Thebaid, and Brazil). Growing on the inland slope of the sea-beach; and apparently the same species, on the summit of the Amancaes mountain-ridge.

Leptochloa (No. 1). In the environs of Lima.

Eragrostis (No. 27); like E. pilosa, but larger. On the exsiccated portions of the river-bed of the Rimac, towards its mouth.

(Brizopyrum) thalassicum, (No. 3; compare No. 1 Oregon, California, our Atlantic coast, and Patagonia); Poa of Kunth; and a congener of our Uniola spicata. Leaves short, crowded, distichous. Maritime; being the prevailing plant in the depressed ground back of the sea-beach.

Rottboella (No. 3). In the environs of Lima.

Andropogon (No. 33). Eighteen inches high; the spikes terminal, hairy. In the environs of Callao.

Equisetum (No. 10; compare No. 9 Chili). Upright, five to nine feet high. Frequent in wet ground among bushes, in the environs of Callao and Lima.

——— (No. 11). Having the habit of E. scirpoides; but eighteen inches long, being procumbent with the branches secund. Frequent in the infiltrated ground.

Azolla (bis No. 2 California, Brazil, North Patagonia, and Chili). Aquatic; abounding in the environs of Callao.

Acrostichum (No. 18). One to five feet high, with the habit of Gymnogramma; frond with the segments three-parted, linear-lanceolate, whitish beneath. Frequent in the infiltrated ground in the environs of Callao and Lima.

Adiantum (No. 30). On the "Amancaes mountain," Brackenridge.

(Thelypteris No. 17; compare No. 16 Chili); near Aspidium thelypteris. Seen only in artificial localities; on the overhanging banks of deeply-cut irrigating canals, around Lima.

Hepaticæ. Extremely rare; chiefly confined to the artificial banks of deeply-cut irrigating canals.

Musci. Extremely rare; and like the Hepaticæ, chiefly confined to the overhanging banks of deeply-cut irrigating canals; in a few instances, met with in situations undisturbed by art.

(Panicum?). Paspalum-like; six to twelve spikes, alternating in a raceme six inches long, but at the summit aggregated; the florets pointed. In the environs of Callao.

Chloris radiata?. On the exsiccated portions of the river-bed of the Rimac, below Lima.

(Eragrostis) ciliaris, (bis Zanzibar). On the exsiccated portions of the river-bed of the Rimac, below Lima.

Bambusa?. A species of bamboo, planted in a garden at Lima.

(Imperata?; compare Pappophorum? of the Samoan and Feejee Islands, and East Indies); Saccharum of authors. Small, slender, three to five feet high. On the exsiccated portions of the river-bed of the Rimac at Lima.

Sorghum (Halepense?; compare No. 1 East Indies, Dekkan, and the Thebaid). Having the habit of Panicum; the florets small. Growing spontaneously along the irrigating canals in the vicinity of Callao.

Lichens. Abundantly intermingled with the Tillandsias, and of the same grey color; together forming beds that overspread the Desert mountain-summits. There seemed, however, to be very little variety in species, and only three or four genera.

Fungi. Seemed extremely rare, at least, the larger species. They did not, however, receive special attention; and were not very diligently searched for.

3. The Peruvian Mountain-region, on the Slope of the Andes.

On the morning of the 18th of May, our party left Yaso, journeying Eastward along the river; and were first made aware of the enormous depth of the valley in which we were travelling, by our guide pointing out above us the village of St. Joseph's. Though only half-way up the steep acclivity, the village seemed but a speck, to most of our party for a long time indistinguishable.

The mountain-heights forming the sides of the valley, were no longer uniformly grey; but on their upper portion were distinctly tinged with green. Two leagues from Yaso, they were greenish to the base; and an *Agave?* made its appearance; in clusters of huge bayonet-shaped leaves around a central flower-stem twenty feet high, stationed at intervals in rocky places as far up as the eye could reach; a striking introduction to a new botanical region.

The sudden change in the buildings from flat to inclined roofs also indicated, that we were entering a district subject to rain. A regular "rainy season" was in fact spoken of; that the rains are scanty, or with periods of drought intervening, appeared afterwards from the absence of trees and forest-growth throughout this mountain-region.

As our party proceeded, the distinction between the vegetable growth on the upland and in the infiltrated ground, disappeared. Grasses became frequent, and were spread over the whole face of the country; with an accompanying universal freshness unknown in rainless districts. The cane-brakes ceased, the bottom of the valley being narrower; and the ascent soon becoming steep, there was no longer room for marshes; the few wet-ground plants present, being confined to the immediate margin of streams.

Shrubs in considerable variety were frequent, and even somewhat luxuriant; but nowhere growing in tangled thickets; and *tree-like* plants were met with of the height of shrubs, the trunk very large, dividing above into a few stout spreading branches.

The objects principally attracting the eye, were the *Cactaceæ;* not such as we are accustomed to in conservatories; but from the variety of fantastic shapes, presenting cactus scenes altogether undreamed of. Numerous species were observed; but forming inconvenient specimens, we were obliged to leave most of them unrecorded.

Tillandsias were in greater variety than in the Desert-region below; but instead of growing on the ground, they had resumed their proper station, on the branches of shrubs, on Cacti, and on the face of projecting rocks.

The entire absence of the wildness and magnificence of forest-clad countries, gave rise to a feeling of disappointment. The ground was everywhere covered with gaudy flowers, like a garden run wild; growing, not in beds, but promiscuously, and separately interspersed, and admitting of the following enumeration by colors: green, with the herbage, being in a good measure lost sight of; scarlet was sprinkled around in brilliant flowers, of an *Indigofera*, *Scutellaria*, several *Salvias* and *Mutisias;* blue, profusely intersprinkled in flowers of other *Salvias*, of a *Plumbago*, several *Polygaleæ* and *Lupines;* orange, in flowers of *Tropæolums*, *Loasas*, and of a *Lobelia;* purple, in the flowers of a Bacasia or *Barnadesia*, and of a *Boerhaavia* remarkable for its large corolla; but over all the rest, and the whole face of the country, bright-yellow predominated, from the array of *Calceolarias*, *Senecios*, and *Helianthoid Compositæ*.

Cattle were now seen upon the hills; and the ascent continuing steep; at the end of "six leagues," or four from the commencement of the region, we arrived at noon at OBRAJILLO: a cluster of perhaps a hundred cottages, situated a mile from CANTA, a smaller village that has given its name in books to this botanical locality.—In the afternoon, Mr. Brackenridge and myself, made an excursion to the cascade on the opposite mountain-slope. For once, we were in the season of the *annual plants;* though some of the species seemed fugacious enough to spring up, flower, and ripen seed, more than once a year, or even with a passing shower. The term "annual" is therefore hardly more applicable than in the Atacaman Desert-region farther South; where plants are known to make their appearance only with the occurrence of rain, at intervals of many years.

Through the assistance of Mr. Rich, we were enabled to continue our journey; and, on the 19th, having procured a new set of mules,

we proceeded up the steeply-inclined valley. A marked diminution in the variety of plants was soon manifest, the shrubs being fewer, and the country in general less flowery, and more grassy; with the sward, large-flowered *stemless Compositæ* beginning to make their appearance. After travelling "four leagues," we arrived at the hamlet of Culuay; where all cultivation ceased, at the estimated elevation of ten thousand feet. The width therefore of this botanical region, from the commencement of the rains, as measured along the bottom of the valley, proved about twenty geographical miles.

Two days afterwards, we visited by the way of the Paramera, the limit of cultivation, several leagues farther North, at Baños in the Chancay Valley.

Character and Composition of the Vegetable Growth. On first entering the mountain-region, the unwooded plains of North America were brought unexpectedly to mind, by *Daleas* making their appearance; in company too with *Lupines* and *Castilleias*, and among the grasses an *Atheropogon*. Other North American analogies were observed, in a *Phaca* resembling P. villosa, one or more species of *Ribes*, a *Mimulus*, and a *Sisyrinchium*. But the flowers of many representatives of Northern Tribes, were strangely different in color; yellowish-orange in *Lobelia*, brilliant scarlet in *Scutellaria*, rose-colored in *Sisyrinchium*, very dark blue in *Polygala;* and the upper leaves, purple in *Castilleia*.

On the other hand, Austral or Chilian analogies proved rare; but were traceable in the presence of *Quinchamalium*, *Kagenekia*, *Alonsoas*, *Monninas*, *Adesmias*, *Polyachirus*, a Rumex-leaved twining *Helxine?*, and a shrubby *Psoralea*.

There were indeed other tribes of plants common to Chili, but belonging rather to the whole mountain-chain of the Andes: as *Mutisias*, *Calceolarias*, *Tropæolums*, *Loaseæ*, *Aldea*, and various *Senecioid Compositæ*.—After excluding all the general Cordillera Tribes, various genera remain that seem peculiarly Peruvian; growing only on the Intertropical portion of the Andes; as among others, the splendid *Tacsonias*.

Beyond the presence of *Cactaceæ*, *Bromeliaceæ*, two *Boerhaavias*, and the scarlet-flowered *Indigofera*, Tropical Tribes proper, were very seldom met with; were reduced to *Amomum? racemosum*, a *Lantana*, two *Justicieæ*, the *Peperomias*, a purple-flowered *gen. Bignoniac.*, a *Commelina*, two *Cucurbitaceæ*, and a *Cleome*.

Of Families of plants not met with in Lower Peru, the following made their appearance with the rains, in the mountain-region:

Capparidaceæ,	Cucurbitaceæ,	Urticaceæ,
Linaceæ,	Lobeliaceæ,	the genus Ephedra,
Rosaceæ,	Phytolaccaceæ,	Iridaceæ, and
Crassulaceæ,	the genus Quinchamalium,	the genus Lycopodium.

Throughout the region, the prevailing families of plants appeared to be seven; occurring in the following order of frequency:

1. *Compositæ.* In great profusion; and including an unusual variety of genera and species.

2. *Graminaceæ*, or grasses. Frequent throughout; and predominating over all other tribes, towards the upper margin of the region.

3. *Leguminosæ.* In very considerable variety; but the species in general, either herbaceous or subherbaceous.

4. *Rhinanthaceæ.* Holding the fourth place, chiefly on account of the profusion of *Calceolarias;* but *Bartsieæ* were also frequent.

5. *Solanaceæ.* Yet more abundant than in Lower Peru; occurring in perhaps a greater variety of forms or genera than in any other part of the globe.

6. *Labiatæ.* The species, unlike those of Chili, chiefly herbaceous.

7. *Bromeliaceæ.* Abounding in the lower portion of the region.

Next after the above seven, *Cactaceæ* were perhaps the most abundant Tribe; especially in the lower portion of the region, as already intimated. *Valerianaceæ* also abounded; together with *Amaranthaceæ*, *Polygalaceæ*, *Loaseæ*, *Lobeliaceæ*, *Nyctaginaceæ*, and *Oxalidaceæ.*

Of Cryptogamous plants, serving as a test or gauge of the humidity of climate: *Ferns* were now frequent, and in considerable variety, but the species were all small, and confined chiefly to the clefts of rocks; a *Lycopodium*, resembling L. rupestre, made its appearance, growing upon rocks exposed to the sun; *Musci* or mosses, and *Hepaticæ*, were much more frequent than in Lower Peru; *Lichens* seemed also in fair proportion; and in regard to the larger species of *Fungi*, as far as I could recollect (when writing my journal), they are not so completely excluded as from the Desert-region below.

Negative Characters. *Orchidaceæ* continued rare; two species only were met with, both of them growing on the ground. *Cyperaceæ*, and especially *Scirpeæ*, were much rarer than in Lower Peru; doubtless, owing in part to the extremely small proportion of marshy ground.

The following tribes of plants were not met with; but growing in an adjoining region, either lower down or higher up, are probably not altogether excluded from the intervening limits:

Papaveraceæ (seen lower down),
Tiliaceæ (lower down),
Ampelidaceæ (lower down),
Zygophyllaceæ (lower down),
Rhamnaceæ (lower down),
Terebinthaceæ (lower down),
The tribe Mimoseæ (lower down),
Lythraceæ (lower down),
Paronychiaceæ (higher up),
The tribe Saxifrageæ (higher up),
Primulaceæ (lower down),
Gentianaceæ (higher up),
The tribe Antirrhineæ (lower down), and
Typhaceæ (lower down).

The absent Families have been already enumerated in a general List; but those whose absence is especially significant and characteristic, may be here specified:

Violaceæ,
Cistaceæ,
Droseraceæ,
Hypericaceæ,
Aceraceæ,
the genus Spiræa,
the genus Fragaria,
the genus Potentilla,
the genus Rosa,
the genus Fuchsia,
Melastomaceæ,
Myrtaceæ,
Araliaceæ,
Cunoniaceæ,
Escallonieæ,
Caprifoliaceæ,
Loranthaceæ,
the tribe Cynareæ,
the tribe Nassauvieæ,
Ericaceæ,
the tribe Apocyneæ,
Proteaceæ,
the tribe Coryleæ,
the tribe Betulineæ,
Coniferæ proper,
Smilaceæ, and
Araceæ.

The following plants were found growing in the Peruvian mountain-region; between the commencement of the rains and the termination of cultivation, or from the elevation of about five thousand feet to that of ten thousand:

Clematis (No. 15). A vine; pubescent; leaves triternate, the leaflets small, dentate; broad floral-leaves; the flowers greenish. Frequent in the upper portion of the region; in the Canta Valley along the ascent to Culuay, and in the Chancay Valley at Baños.*

Thalictrum (No. 6). Frequent, according to my recollection (when writing my journal), in the Canta Valley around Obrajillo. No specimens.

Ranunculus? (No. 26). Two to three feet, and spreading; the upper leaves incised, but opposite; carpels oblong, with the point inflexed. In the upper portion of the region, along the ascent to Culuay.

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* Sisymbrium (athrocarpum of Gray; No 10; near No. 6 Mount Rainier ridge in Oregon), and S. canescens. Leaves bipinnatifid. From Obrajillo to the Paramera; apparently indigenous, but occasionally seen growing as a weed in cultivated ground.

Brassica oleracea, (bis Lower Peru, and No. 1 Europe); the cabbage. Seen under cultivation in the lower portion of the region.

Berberis (No. 8). A shrub, three to five feet high; leaves oblong, two-thirds of an inch by one-third, obtuse or sometimes apiculate, entire, the under surface glaucous; flowers not seen. In the upper portion of the region, along the ascent to Culuay; rare.

Arabis? (No. 16). Annual?; two feet high; leaves few, lyrate; a slender plant, with long, slender pods. In the lower portion of the region, along the ascent to Obrajillo; once only met with.

Cremolobus (No. 1). Annual; three to nine inches high; the leaves dentate; locul. ex apice pendul. Frequent in the lower portion of the region, as far as and around Obrajillo.

Menonvillea linearis? (No. 1). Annual, six to ten inches high. Frequent around Obrajillo, and elsewhere in the mountain-region.

——— (No. 2); apparently a second species. Six to twelve inches high; leaves pinnatifid, and mostly radical; silicle smaller, and not alate. In the upper portion of the region, along the ascent to Culuay.

Lepidium bipinnatifidum? (No. 10); annual. Frequent in the Canta Valley around Orajillo.

Cleome (No. 8). Herbaceous, branching, one to three feet high; flowers white. Frequent in the upper portion of the region, along the ascent to Culuay.

Polygala (No. 21). Ornamental, three to five feet high, branching; leaves one and a half inches by three-fourths of an inch; flowers large, dark blue. In the Canta Valley around Obrajillo.

Monnina (No. 4). Annual, three to ten inches high; leaves broad-lanceolate; fruit alate. Frequent in the lower portion of the region, along the ascent to Obrajillo.

——— (No. 5). Annual, three to eight inches high; leaves broad; flowers small; the fruit reticulate, and very slightly crested. In the environs of Obrajillo.

Stellaria (No. 14). Like S. uliginosa; closely pubescent; the leaves ciliate. In the environs of Obrajillo.

———? (No. 15). Weak, one to three feet long, with a few spreading branches; leaves sessile, ovate, acuminate. In the environs of Obrajillo.

Silene? (No. 15). Annual; very small, only half an inch to two inches high; leaves oblong; calyx spreading, the segments long, linear; corolla very small. In the upper portion of the region; along the ascent to Culuay, and in the Chancay Valley at Baños.

Drymaria (No. 2). Annual; three inches to two feet; leaves reniform; flowers small; calyx-segments obtuse. Frequent in the environs of Obrajillo, and elsewhere in the mountain-region.

——— (No. 3); a second species. Leaves reniform; flowers with close pubescence; calyx-segments acute. In the environs of Obrajillo.

(——— macrantha of Gray, No. 4; recorded as) nov. gen. Caryophyll. Upright, many-stemmed, a foot high; leaves sessile, cordate; calyx a third of an inch long; no corolla; five stamens, one style, and two stigmas; capsule coriaceous, obtuse. In the lower portion of the region, as far as and around Obrajillo.

Erodium (compare Chilian Andes). Annual; two to three inches high; leaves multifid, and minutely divided; small purple flowers. In the vicinity of Culuay?.

———; decumbent, a foot long; leaves multifid; scattered hairs. At the upper margin of the region at Baños.

(——— fasciculata of Gray, No. 5; recorded as) gen. Stellarioid; having the habit of the preceding plant. Annual; leaves sessile, broad-ovate; flowers crowded in a terminal cluster, with scarious bracts; calyx a fourth of an inch long; petals bifid. In the environs of Obrajillo.

(Malvastrum, No. 2; recorded as) Malva?, near M. Limensis. Annual?; three inches to two feet; leaves repand, deeply 3-5 lobed; calyx pilose, the segments of the outer calyx linear; flowers small, blue. In the environs of Obrajillo.

(———, No. 3; recorded as) gen. Malvac.?. One to two feet high; densely tomentose; leaves repand, dentate; outer calyx of three linear segments; flowers small, pale blue; carpels with tomentose awns. In the environs of Obrajillo.

(———, No. 4; recorded as) gen. Malvac.?; a second species. Annual; with small blue flowers; calyx naked, or simple; carpels five, tuberculate, biaristate. In the lower portion of the region, along the ascent to Obrajillo.

Abutilon? (No. 11); leaves pubescent, broad-cordate; flowers yellow; carpels about fourteen, mutic. In the lower portion of the region, along the ascent to Obrajillo.

Waltheria? (compare No. 3 Yaso in Lower Peru), and also Sida. A shrub, three to six feet high; leaves large, dentate, somewhat strigose; linear bracts; but the calyx naked or simple; flowers yellow, crowded in the axils. Extending into the lower portion of the region, below Obrajillo.

Cardiospermum (compare No. 2 Amancaes mountain in Lower Peru). Decumbent, many stemmed, pubescent. In the lower portion of the region, along the ascent to Obrajillo.

Linum (compare No. 10 Lower Chili). The flowers yellow. In the environs of Obrajillo.

Geranium (No. 14). One to two feet, herbaceous, weak-stemmed, covered with long pubescence; leaves three to five-lobed, incised; flowers small; the carpels also covered with long pubescence. Along the upper margin of the region at Baños.

Tropæolum (No. 3); leaves peltate, slightly lobed, with a deeper emargination at base; flowers deep orange. Frequent in the lower portion of the region, along the ascent to Obrajillo.

——— (No. 4); leaves deeply four-lobed; flowers scarlet. Frequent in the Canta Valley, from Obrajillo to the Paramera at Culuay.

Oxalis (compare No. 29 Amancaes mountain in Lower Peru). Slightly hairy; and having a woody root; calyx-segments broad at base, cordate?. At Baños, and elsewhere in the mountain-region.

——— (No. 30). Annual; half an inch to an inch high, minutely pubescent; scarious sheaths at base; leaflets obcordate; flowers very small, yellow. In the upper portion of the region, along the ascent to Culuay, and in the Chancay Valley at Baños.

Lupinus (No. 26). Suffruticose, three to five feet high, with spreading branches; leaflets six to seven, sericeous beneath; flowers large, blue and white. Growing along the ascent to Obrajillo, and also at the upper margin of the region at Baños.

———?; two to four feet long, the stem weak; stipules; leaves roundish-ovate, dentate. In the vicinity of Obrajillo.

———; perhaps a fourth species.

Tropæolum tuberosum, (No. 5); three-lobed leaves, and not seen in flower. The root edible, even in the crude state. (Of Aboriginal cultivation; and at the present day) abundantly planted in the upper portion of the region, as far as the Paramera.

——— (No. 27). Annual; a foot high; pilose; flowers with the carina white, and the alæ pale-blue; pod broad, compressed. In the lower portion of the region, along the ascent to Obrajillo.

Trifolium (No. 23); having the habit of T. repens. Pubescent; and apparently a peculiar species. In the upper portion of the region, along the ascent to Culuay.

Indigofera (No. 26). Decumbent, spreading; the flowers larger than usual, scarlet, and showy. Abounding in the lower portion of the region, along the ascent to Obrajillo.

Psoralea (No. 13); having the habit of the Chilian species. A coarse shrub, six feet high; pubescent. In the lower portion of the region, growing just below Obrajillo; rare.

Dalea (Ayacavensis, Kunth?; No. 2); leaflets in about eight pairs; calyx-segments long acuminate. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 3); a second species. Leaflets in about six pairs; bracts and calyx smoothish; flowers blue and white. In the environs of Obrajillo.

Phaca (No. 9); near P. villosa; but the leaflets linear. In the lower portion of the region, along the ascent to Obrajillo; somewhat rare.

Lathyrus (No. 12). Large; the stipules semi-hastate; leaflets mostly in a single pair, lanceolate, two inches in length. In the environs of Obrajillo.

——— (No. 13); near L. myrtifolius. A foot high, the stem not alate; stipules narrow; leaflets in five to six pairs; calyx-segments long, acute. In the environs of Obrajillo.

Adesmia (hispidula, Kunth?; No. 6). Annual, herbaceous, spreading; pod five to six-jointed, setose. In the environs of Obrajillo.

——— (No. 7). Herbaceous, decumbent; long plumose setæ on the pod. In the environs of Obrajillo.

Desmodium (No. 41); hairy; with broad floral-bracts; and large purple flowers. In the lower portion of the region, along the ascent to Obrajillo.

Cassia (No. 27). A "shrub, twenty feet high;" resembling C. floribunda. In the lower portion of the region, "below Obrajillo," Brackenridge.

Aphanes (No. 3). Procumbent; leaves pinnately multifid, dissected. At the "cascade opposite Obrajillo," Rich.

Acæna?, lappacea (No. 7). A foot high, the foliage resembling that of a rose. In the upper portion of the region, along the ascent to Culuay.

Rubus (No. 30). Like the Brazilian species, but ten feet high; the stem and leaves pubescent; small white flowers. Growing about a league within the lower portion of the region, and three leagues from Obrajillo; rare.

Kagenekia lanceolata, Ruiz & Pav. (No. 2). A shrub, five feet high; leaves green on both sides, broader and more finely serrate than in the Chilian species. In the lower portion of the region, along the ascent to Obrajillo; rare.

(Hesperomeles cuneata?, No. 1; recorded as) Cratægus. A shrub, one to three feet high; rigid and tortuous, with numerous spreading branches; leaves cuneate, obtuse, serrate; corymbs few-flowered. In the Canta Valley, from Obrajillo to the Paramera.

Oxalis crenata, (No. 31); not seen in flower; the root edible. (Of Aboriginal cultivation; and at the present day) abundantly planted in the upper portion of the region, as far as the Paramera.

Spartium junceum, (bis Lower Peru, and No. 2 Europe). Naturalized in the lower portion of the region, as far as Obrajillo.

Oenothera (No. 19); capsule sessile, covered with long, soft hairs; petals a fourth of an inch, repand at the apex. In the environs of Obrajillo; and perhaps the same species, at the upper margin of the region at Baños.

——— (No. 20); smoothish; the leaves entirish; capsule sessile, somewhat attenuate at base, slightly winged at the apex. In the environs of Obrajillo.

(Cyclanthera Matthewsii?, No. 1); gen. Cucurbitac. Small; leaves deeply divided into about five lobes; flowers inconspicuous; fruit prickly. In the environs of Obrajillo.

Gen. Cucurb. (No. 1). Leaves petioled, broad-cordate, dentate; flowers inconspicuous; fruit smooth. In the environs of Obrajillo.

Tacsonia (No. 1.) Entirely pubescent; stipules cordate, fimbriate; flowers large, red and showy. In the upper portion of the region, along the ascent to Caluay, and in the Chancay Valley at Baños.

——— (No. 2); less tomentose, and the lobes of the leaves broader; the flowers greenish, with a shorter tube. In the upper portion of the region, along the ascent to Culuay.

——— (No. 3); less pubescent; and more slender; trifoliolate; the flowers not seen. In the upper portion of the region, along the ascent to Culuay.

Carica? (No. 4); compare sp. of Amancaes mountain in Lower Peru. Leaves broad-cordate, eight inches by five, entire, the under surface incano-tomentose. In the lower portion of the region, growing about a league from Obrajillo.

Gen. incert. (No. 1). A low tree, only four to ten feet high, but having a large trunk and a few stout branches; smooth; leaves tri-lobed, the lobes acuminate; flowers and fruit not seen. In the lower portion of the region, growing about a league from Obrajillo.

Loasa (bis No. 8 Yaso in Lower Peru). Three to four feet high, herbaceous, and rank-growing; covered with stinging hairs, more abundant on the calyx; leaves repand, five to seven-lobed; flowers large, orange-colored, and ornamental. Frequent throughout the mountain-region, to the Paramera at Baños.

——— (No. 9). Stem weak and trailing; leaves pinnatisect and dentate, more divided than in the last species, but the flowers similar, and equally ornamental. Along the upper margin of the region, in the Canta Valley at Culuay, and in the Chancay Valley at Baños.

Tillæa connata, Ruiz & Pav. (No. 7). Annual, half an inch to two inches high; calyx-segments four. Abundant on walls and rocks around Obrajillo and beyond, along the ascent to Culuay.

Escheveria (No. 3). Nine inches high; leaves smooth, pointed; flowers scarlet. In the lower portion of the region, as far as and around Obrajillo.

Melilotus? (compare California, Patagonia, Chili, and No. 1 Europe). Annual; four to ten inches high; flowers small, yellow; pod not exceeding the calyx. Growing in a seemingly indigenous manner, in the upper portion of the region, beyond Obrajillo.

——— cœrulea?. Crops of blue melilot observed in the lower portion of the region.

Faba vulgaris, (bis Egypt, and No. 1 Northern Asia). Cultivated in the middle of the region, around Obrajillo.

Malus sylvestris, (bis Lower Peru, and No. 1 Europe); the apple. Cultivated sparingly in the lower portion of the region; but the trees did not appear to be in a thriving condition.

——— (No. 4). Nine inches, or of the same size with the preceding; pulverulent; the leaves less acute; the calyx-segments shorter; flowers scarlet. At the upper margin of the region at Baños.

Sedum? (No. 13); short fleshy leaves. Growing on rocks, from Obrajillo to the Parasera at Culuay.

Cereus (bis No. 11 Yaso in Lower Peru). Frequent throughout the lower portion of the region, as far as Obrajillo.

———? (No. 14); perhaps a congener of No. 13; compare also Opuntia and Echinocactus. The whole plant ovoid, and six to eight inches high; flowers scarlet, and showy. In the upper portion of the region, growing two and a half leagues from Culuay.

Opuntia (No. 13). Normal; flat-jointed; like C. tuna; and three to five feet high. From the commencement of the rains and of the region, to Obrajillo.

——— (No. 14); "habit of O. Curassavica; procumbent, fragile; stem-joints four inches, long-ovoid, flattish; the flowers not seen. Between Yaso and Obrajillo," Brackenridge.

———? (No. 15). Ten to fifteen feet high, with a stout woody trunk, and many spreading branches; the latter composed of joints, ten inches by five, regular and ovoid, having about six longitudinal ribs; the whole plant of a greyish tint. In the lower portion of the region, along the ascent to Obrajillo.

Nov. gen. Cactac. (No. 1). Eight to ten feet high; the trunk slender, woody at base, rigid and upright, with wide-spreading candelabra-like branches at the summit; distant clusters of long thorns; fruit dry, capsular, two inches long, with large stony seeds. Along the upper margin of the region at Culuay; in some instances forming groves.

Ribes (No. 14); leaves smooth, repand, dentate; fruit almost sessile. Along the upper margin of the region at Culuay.

——— (No. 15); not glandular; leaves abruptly cuneate at base, plicate. In the environs of Obrajillo.

——— (No. 16); a normal currant. Three to six feet high; leaves pentagonal, an inch in length and breadth, denticulate, the margin having numerous dentures, and the upper surface dotted; flowers in long bracteate racemes. Along the upper margin of the region at Baños.

Bowlesia lobata, Ruiz & Pav. (No. 1); leaves deeply divided into from three to five lobes. Frequent at Obrajillo, and elsewhere in the mountain-region.

Hedyotis? (No. 20). An ornamental shrub, eight to twelve inches high, branching; leaves linear, involute. Frequent in the environs of Obrajillo.

Galium aparine? (compare No. 5 Oregon, our Atlantic States, and Terra del Fuego); leaves linear, about seven in a whorl. Frequent in the environs of Obrajillo, and to all appearance indigenous.

——— (No. 24); leaves broad, verticillate in fours; flowers larger than usual; the fruit setose. In the environs of Obrajillo.

Helosciadium leptophyllum? (No. 2; compare Australia); a congener of Æthusa nodiflora?. One to two feet high, diffuse, branching; leaves multifid, the segments linear; mericarps five-ribbed. Growing around Obrajillo.

———; perhaps the same species; but annual, and only two to three inches high. Growing beyond and above Obrajillo.

Valeriana (No. 8). Two to three feet; leaves pinnatisect, dentate. In the environs of Obrajillo.

——— (No. 9). Two to three feet, herbaceous and weak-stemmed; leaves lanceolate, with a few laciniæ, the radical leaves long-petioled. In the environs of Obrajillo; and along the upper margin of the region at Baños.

——— (No. 10). Herbaceous, three to five feet; leaves broad, pinnatisect, divided into three or four pairs of lobes, besides the terminal lobe; a large leafy panicle. Along the upper margin of the region at Baños.

(Achyrophorus? No. 2). One to two feet high; Hieracium-like, but the pappus pedicelled; leaves mostly radical; calyx-scales in two to three series. In the environs of Obrajillo.

Leontodon (No. 4). Stemless; leaves lanceolate, slightly dentate; flowers large. In the Canta Valley, from Obrajillo to the Paramera at Culuay.

Gen. Cichorac. (No. 1). Twelve to eighteen inches high; habit of N. American Barkhausia (Pyrrhopappus), but the pappus sessile; leaves mostly radical, smooth, lyrate, dentate. In the upper portion of the region, along the ascent to Culuay.

(Barnadesia) spinosa? (No. 1); Bacasia of some writers. An ornamental shrub, four to eight feet high, with large purple flowers; leaves and young twigs somewhat tomentose; calyx-scales long, and tomentose. Frequent in the upper portion of the region, along the ascent to Culuay.

(———) corymbosa? (No. 2); perhaps not distinct from the last; agreeing in habit and in the leaves, but the flowers corymbose, and no floret-rays. At the cascade opposite Obrajillo.

Mutisia (No. 4); stem alate, and the alæ dentate; leaves auriculate at base, sessile, almost linear. In the upper portion of the region, along the ascent to Culuay.

——— (No. 5); highly ornamental; the leaves pinnate. Abounding in the environs of Obrajillo, and elsewhere in the mountain-region. No specimens.

Polyachyrus (echinopsoides?, No. 2). Spreading, lanate; leaves amplexicaul, auriculate, lyrately pinnatisect. In the upper portion of the region, along the ascent to Culuay; rare.

Dumerilia (bis No. 1 Yaso in Lower Peru). Two to three feet high; leaves an inch in length and breadth, appendiculate at base, seven-lobed, tomentose beneath; flowers solitary, large; the floret-rays purple. Throughout the lower portion of the region, as far as and around Obrajillo.

——— (No. 2). A shrub, three to five feet high; the stem pubescent; leaves pubescent on both sides; flowers corymbose, devoid of floret-rays?. In the lower portion of the region, as far as and around Obrajillo.

——— (No. 3). A shrub, five feet high; stem and upper surface of the leaves smooth; flowers not seen. In the lower portion of the region, along the ascent to Obrajillo; somewhat rare.

(Gen. Compos.? No. 1; recorded as) gen. incert.. A branching bushy shrub, with terminal branching spines; leaves oblong, attenuate, obtuse, serrate, acuminate; the under surface reticulate; flowers not seen. In the lower portion of the region, growing about a league from Obrajillo.

Daucus?. Weak, diffuse, branching; the involucral leaves dissected. Growing around Obrajillo.

Piqueria (compare No. 1 Lower Peru); margin of the leaves with long dentures. Frequent in the environs of Obrajillo, and elsewhere in the mountain-region.

——— ? perhaps not distinct; broad-leaved at base. In the lower portion of the region, along the ascent to Obrajillo.

Stevia? (No. 3); leaves broad dentate; about six calyx-scales. Growing in the environs of Obrajillo.

Eupatorium (No. 19); having something of the habit of E. perfoliatum. Three to five feet high; leaves lanceolate, rugose; flowers pale-blue. In the upper portion of the region, at Baños and elsewhere.

——— (No. 20); having the habit of Chilian sp., and of E. ageratoides. Two to three feet high; leaves petioled, cordate. Frequent in the upper portion of the region, along the ascent to Culuay.

——— ? (No. 21); having the habit of Brickellia. Three to five feet high; leaves opposite, rugose, petioled, lanceolate, but obtuse at base; large blue flowers. In the environs of Obrajillo.

——— ? (No. 22); leaves petioled, unequally cordate, crenate, the under surface tomentose; calyx-scales triserial, ribbed. In the environs of Obrajillo.

Ageratum ? (No. 2; compare No. 1 Brazil, and the Polynesian Groups to Hindostan and Zanzibar). Leaves petioled, broad-ovate; flowers purple; calyx-scales uniserial. In the environs of Obrajillo.

Nothites? (No. 3); more paniculate than sp. of Lower Peru. Leaves petioled, ovate, dentate; calyx-scales about five, uniserial; pappus none. In the lower portion of the region, along the ascent to Obrajillo.

Gen. Eupatorioid (No. 1). A spreading shrub, three to five feet high; leaves short-petioled, cordate, serrate; about six broad calyx-scales, uniserial. In the upper portion of the region, along the ascent to Culuay.

(Liabum ?, No. 1); Aster-like. Annual, spreading, three to four inches high, lanate; flowers large, purple; calyx-scales long acuminate, and in about three series; five stout pappus-rays, amid numerous shorter ones of unequal length, all of them nearly naked. In the environs of Obrajillo.

(——— ?, No. 2); Aster-like; a second species. One to two feet high; leaves dentate, smooth above. In the lower portion of the region, along the ascent to Obrajillo.

(Cænotus ?, No. 12); like C. Canadensis; the leaves entire, obtuse. In the lower portion of the region, along the ascent to Obrajillo.

Baccharis? (No. 25); "chilca." Suffruticose; leaves confert., 1¼ inches long, attenuate at base, lanceolate, dentate; calyx-scales in two to three series. Growing in the environs of Obrajillo.

——— (No. 26); leaves broad-lanceolate, entire at base, tri-nerved, dentate; inflorescence terminal ?. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 27). Normal; leaves cuneate, with a few dentures; pappus long. In the environs of Obrajillo.

Sambucus Peruviana, Kunth, (No. 7); arborescent, ten to twenty feet high. Frequent around Baños, at the upper margin of the region, but perhaps only planted. No specimens.

Pluchea? (No. 8); leaves obovate, two inches by one, denticulate; calyx-scales triserial. In the environs of Obrajillo.

Gnaphalium (compare No. 50 Lower Peru). Annual, a foot high, lanate; leaves linear-lanceolate. In the environs of Obrajillo.

——— (No. 53); having the habit of G. purpureum; the calyx-scales blackish. In the environs of Obrajillo; and perhaps the same species, at Baños.

——— (No. 54). One to two feet high; leaves decurrent, their upper surface smooth. In the environs of Obrajillo.

——— (No. 55). Procumbent, branching, rising an inch above the ground; the flowers crowded among the leaves. In the environs of Obrajillo.

Senecio (No. 36). Three to four feet high; leaves lyrately pinnatisect, the segments linear. In the lower portion of the region, along the ascent to Obrajillo.

——— (No 37); smooth. The stem three inches high, or sometimes wanting; large yellow floret-rays. In the upper portion of the region, along the ascent to Culuay.

Senecioid (No. 1); having the habit of Sonchus. Herbaceous, decumbent; the stem and under surface of the leaves tomentose; leaves large and broad, dilated at base, amplexicaul, lyrate. In the environs of Obrajillo.

——— (No. 2). Suffruticose; leaves petioled, broad, dentate, the under surface lanate. In the environs of Obrajillo.

——— (No. 3); having the habit of some species of Hieracium. Herbaceous, one to two feet high; leaves repand, lyrate; the petiole three inches long; about six large flowers. In the environs of Obrajillo.

——— (No. 4). Herbaceous, a foot high, tomentose; leaves amplexicaul, auriculate at base, panduriform, undulate. Along the upper margin of the region at Baños.

Tagetes (No. 3). Annual, three to twelve inches high; flowers inconspicuous; calyx monophyllous, terminating in five to six dentures; six pappus-rays. Abounding in the environs of Obrajillo.

Arnicoid (No. 1). Leaves opposite, ovate, dentate, the under surface white; flowers yellow, the florets very numerous, and numerous floret-rays; calyx-scales in four series; about seven to eight pilose pappus-rays. In the lower portion of the region, along the ascent to Obrajillo.

Gen. Siegesbeckioid (No. 1). Twelve to eighteen inches high; tomentose; leaves dissected; calyx-scales foliaceous, broad, obtuse, biserial?; floret-rays short, yellow; pappus none. In the environs of Obrajillo.

Polymnia? (bis No. 2 Yaso in Lower Peru). In the upper portion of the region, along the ascent to Culuay.

Zinnia pauciflora, (No. 1); see Lam. 685, f. 1. Annual, six to ten inches high. Abounding in the lower portion of the region, along the ascent to Obrajillo.

Heliopsis? (No. 3); more hairy, and the leaves broader than in the Lima species. In the environs of Obrajillo.

———? (No. 4); perhaps distinct; the flowers very large. In the upper portion of the region, along the ascent to Culuay Either this, or No. 3, observed also at Baños.

Sonchus oleraceus? (compare Taheiti, New Zealand, Auckland Island, Western Oregon, our Atlantic States, North Patagonia, and No. 2 Europe). Growing spontaneously around Obrajillo, but apparently introduced.

Encelia (bis No. 2 Lower Peru); long leaved. Extending into the lower portion of the region, nearly as far as Obrajillo.

Coreopsis odoratissima? (No. 5); compare Feuillée, 50. Having the habit of C. trichosperma; suffruticose, one to two feet high, with many branches; leaves opposite, much dissected; akenium with two soft awns. In the upper portion of the region, along the ascent to Culuay.

Bidens? (No. 16); or compare Coreopsis. Entirely pilosiuscul.; leaves deeply three-parted, as if trifoliolate, incisely dentate; calyx pilose. In the upper portion of the region, along the ascent to Culuay.

———? (No. 17); decumbent, slightly hairy; leaves dissected, multifid. In the environs of Obrajillo.

——— (No. 18). Annual, a foot high, the stem simple; leaves dissected; a single terminal flower; akenium long. Frequent in the lower portion of the region, along the ascent to Obrajillo.

——— (No. 19). Annual, six to eight inches high; stem simple; leaves smooth, trifid, incised; usually a single flower; akenium rather long, the awns short. Frequent in the environs of Obrajillo.

(Oyedæa bupthalmoides, No. 1); gen. Helianthoid. Annual, three to nine inches high, strigose; leaves broad-lanceolate, entirish; akenium with two long chaffs, and four intermediate broad ones. Frequent in the environs of Obrajillo.

(Simsia?, No. 1); gen. Verbesinoid?. Leaves repand, lyrate, amplexicaul or perfoliate, the under surface lanate; flowers large, yellow; calyx-scales 2–3-serial. In the environs of Obrajillo.

Helianthoid (No. 1). Leaves opposite, petioled, ovate, serrate; large yellow flowers. Frequent in the environs of Obrajillo.

Gen. Helianthoid? (No. 1). Leaves opposite, petioled, broad-lanceolate, serrate, closely-pubescent; the flowers not seen. Environs of Obrajillo.

Gen. Rudbeckioid (No. 1); compare Siegesbeckia flosculosa. Leaves opposite, broad-ovate, serrate; receptacle conical, chaffy; akenia devoid of pappus. (At the upper margin of the region in the Canta Valley.)

(Verbesina, No. 2); Parthenioid, having something of the habit of Elephantopus. Leaves decurrent, alternate, attenuate, serrate; calyx-scales biserial; floret-rays short, cream-colored; akenium biaristate, as in Bidens. In the environs of Obrajillo.

Spilanthes (compare No. 3 Lower Peru). Leaves long-petioled; flowers yellow. In wet ground, in the lower portion of the region, along the ascent to Obrajillo.

——— (No. 4). A foot high; leaves broad at base, short-petioled; flowers large, white. In the lower portion of the region, along the ascent to Obrajillo.

Galinsoga? (No. 3). Annual; a foot high; leaves petioled, broad-ovate, hairy; flowers sometimes purple; calyx-scales biserial. Frequent in the environs of Obrajillo.

(Gen. incert., No. 1). Three to six inches high; leaves opposite, pinnatisect, the seg-

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Solanum; like S. nigrum; (compare Polynesian Groups to New Zealand and Upper Egypt, and No. 28 California, Chili, and Lower Peru). In the environs of Obrajillo.

——— tuberosum, (No. 56; bis Lower Peru); the potatoe. (Of Aboriginal cultivation; and at the present day) abundantly planted in the upper portion of the region, as far as the Paramera.

ments incised; flowers inconspicuous; calyx-scales about six, uniserial; akenia resembling the carpels of Ranunculus, acute on each margin; pappus none?. In the environs of Obrajillo.

Gen. Compos.? (No. 1). Entirely tomentose; leaves linear-lanceolate; flowers Gomphrena-like, the calyx-scales scarious and triserial. Locality not recollected.

Lobelia (bis No. 54 lower down). Perhaps belonging properly to the mountain-region.

——— (No. 55); agreeing in habit with the last; the flowers showy, orange-colored. Frequent along the river-bank in the lower portion of the region. No specimens.

(Gonolobus glandulosus?, No. 2); Cynanchoid. A climbing vine; leaves smooth, heart-shaped; cymes trichotomous; flowers greenish-white. In the lower portion of the region, along the ascent to Obrajillo.

(Fischeria Peruviana?, No. 1); Gonoloboid. A climbing vine; leaves tomentose, petioled, cordate; five linear calyx-segments; corolla large, in other respects as in Asclepias. In the environs of Obrajillo.

(Delostoma dentatum?, No. 1; gen.) Bignoniac. Arborescent, five to twenty feet high, ornamental; leaves simple, obovate, serrate; large purple flowers, an inch and a half long; the calyx 2–3–fid, with a dorsal prominence. In the lower portion of the region, along the ascent to Obrajillo.

Aldea pinnata, Ruiz & Pav. (bis No. 2 Chili, the Chilian Andes, and Yaso in Lower Peru). Growing throughout the region to its upper margin.

(Pharbitis?, No. 5; gen.) Convolv. Entirely covered with long pubescence; leaves petioled, cordate; calyx-segments long, acuminate. In the environs of Obrajillo.

(Jaquemontia? No. 4; gen.) Convolv. Smooth; leaves cordate or hastate at base; calyx-segments smooth, obtuse. In the lower portion of the region, along the ascent to Obrajillo.

Dichondra (No. 4; compare Lower Chili). Leaves large; pedunc. short. Along the upper margin of the region, at Baños.

——— (No. 5); lanate; the leaves broad, reniform. In the lower portion of the region, along the ascent to Obrajillo.

Cuscuta (No. 7). In the environs of Obrajillo.

Varronia? (bis No. 3 Lower Peru). Observed only at the commencement, or lower margin of the region.

Heliotropium Peruvianum, (compare No. 10 Amancaes mountain in Lower Peru). One to three feet high; the flowers blue. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 14); smooth, white-flowered. In the lower portion of the region, along the ascent to Obrajillo.

(Pectocarya?) pilosa, (No. 2); Cynoglossum of Ruiz & Pav. Having the habit of Myosotis; annual; six to twelve inches high; the carpels crested. In the environs of Obrajillo.

Cestrum (compare No. 5 Lower Peru), but not auricul.; the leaves broader, petiol., broad at base. In the lower portion of the region, along the ascent to Obrajillo.

Escobedia (No. 1). An ornamental shrub; leaves alternate, lanceolate, half an inch by one-sixth, attenuate; the calyx inferior, with five acute calyx-teeth; the corolla tubular, two inches long, the segments spreading, obcordate; four stamens counted. At the upper margin of the region, planted around houses at Culuay and Baños.

Nierembergia (compare No. 1 Amancaes mountain in Lower Peru). Glutinously-pubescent. Frequent in the environs of Obrajillo.

——— (No. 2); "a second species." In the environs of "Obrajillo," Brackenridge.

Nicotiana (No. 10); near (No. 8) the red-flowered species of Lower Peru. The leaves narrower; the flowers greenish ?. Along the upper margin of the region, at Baños.

Sarracha ? (No. 1). Herbaceous, diffuse; leaves petioled, broad-ovate; calyx persistent, the segments long, acute; fruit oblong-ovoid, acute. In the upper portion of the region, along the ascent to Culuay.

Solanum (No. 57); like S. nigrum, but pubescent, and the leaves repand, dentate. Along the upper margin of the region, at Baños; and perhaps the same species, pubescent, with the leaves angular and dentate, and small flowers, growing around Obrajillo.

——— (No. 58). Near S. tuberosum, but the stem upright, the leaflets or leaf-segments pointed, the flowers bluish and larger. Frequent along the upper margin of the region, at Baños.

——— (No. 59); leaves smooth, ovate; dense cymes of small flowers; the berries small, and red. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 60). A shrub, four to six feet high; leaves petioled, lanceolate, five or six inches long; flowers in a spreading panicle; the calyx and corolla tomentose. Along the upper margin of the region, at Baños.

———(?, No. 61); leaves petioled, broad, three-fourths of an inch by half an inch, entire; flowers very small, three to six from each axil. In the environs of Obrajillo.

Lycopersicum (No. 5). Large and spreading, pubescent; flowers in long, sparse racemes, the pedunc. an inch in length, with broad bracts at base. In the environs of Obrajillo.

Nov. gen. umbellata, (No. 1); Atropa of Ruiz & Pav. Ornamental; leaves petioled, cordate, two-thirds of an inch long, entire; corolla tubular, an inch in length. In the upper portion of the region, along the ascent to Culuay.

——— bicolor, (No. 2); Atropa of Ruiz & Pav. Leaves broad-ovate, acute at each end; calyx-segments broad, short, spreading; corolla three-fourths of an inch long, dull red but tipped with green, broader (than in No. 1), with the terminal segments long and acute; the style much projecting. Growing in the environs of Obrajillo; and also at Baños.

Lycium (No. 10). The branches degenerating into long spines; leaves attenuate, one-fourth of an inch by one-tenth; pedicell. half an inch; five slightly-projecting calyx-teeth. Growing in the environs of Obrajillo.

Gen. Solanac. (No. 1). A shrub, three to six feet high, rigid and branching; the branches degenerating into alternate spines; leaves alternate, obovate, one inch by half an inch, entire; calyx 5-dentate, persistent; the fruit, a berry. In the upper portion of the region, along the ascent to Culuay.

Gen. Solanoid (No. 1). An ornamental shrub, four to six feet high, spreading; the leaves about two inches, elliptical, smooth, entire; terminal corymbs; calyx persistent, having five short lobes; petals white, and somewhat coriaceous; anthers opening by two pores Abounding in the upper portion of the region, along the ascent to Culuay.

Gen. Browallioid? (No. 1); Nierembergia-like. Annual; three to six inches high;

Hyptis spicata? (compare No. 2 Brazil and Lower Peru). Leaves almost cordate; five equal linear calyx teeth. In the lower portion of the region, along the ascent to Obrajillo.

corolla-segments very short, not spreading. In the upper portion of the region, along the ascent to Culuay.

Calceolaria (No. 10); like C. pinnata, but the segments longer. In the lower portion of the region, along the ascent to Obrajillo.

——— bicolor, (No. 11); leaves broad at base, duplicato-serrate; corolla partly yellow, and partly white. Abounding in the environs of Obrajillo, and elsewhere in the mountain-region.

——— (No. 12); leaves subsessile, broad, argutely-serrate, often verticillate in threes; flowers rather small. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 13); pubescent; the leaves repand, lobed. In the lower portion of the region, along the ascent to Obrajillo; and perhaps the same species, at Baños.

——— (No. 14); leaves duplicato-pinnatisect. In the environs of Obrajillo.

——— (No. 15). Suffruticose, branching, pulverulently tomentose; leaves oblong, somewhat obtuse, denticulate. In the environs of Obrajillo.

——— (No. 16); smooth, glutinous?. Upright, two to three feet high; leaves short-petioled, obtuse at base, lanceolate, two inches long, serrulate. In the upper portion of the region, along the ascent to Culuay, C. P.

——— (No. 17); tomentose; leaves broad dentate, half an inch. Along the upper margin of the region, at Baños.

——— (No. 18); leaves pubescent, petioled, broad, crenate. Along the upper margin of the region, at Baños; and perhaps the same species, growing around Obrajillo.

Alonsoa linearis, (No. 2); leaves narrow, dentate. Frequent in the environs of Obrajillo, and elsewhere in the mountain-region.

——— caulialata, Ruiz & Pav. (No. 3); leaves broad-ovate, two inches by one, dentate. In the environs of Obrajillo, somewhat rare.

Herpestis (compare No. 1 Lower Peru). At the upper margin of the region at Baños.

Mimulus (No. 16). Three to six inches, decumbent; leaves reniform, dentate; flowers small, yellow. Growing in wet places, in the environs of Obrajillo: and perhaps also in Lower Peru?

Buddleia (compare No. 4 Lower Peru). In the environs of Obrajillo.

——— (No. 5). A shrub or small tree, ten to twenty feet high; leaves ovate, entire; the upper surface green but pubescent, the under surface incano-lanate; flowers not seen. In the upper portion of the region, along the ascent to Culuay.

Bartsia? (No. 2). Leaves opposite, sessile, broad at base, oblong, undulated, crenate; the floral bracts not colored; flowers rather large, two-thirds of an inch in length; four long acute calyx-teeth. In the upper portion of the region, along the ascent to Culuay.

(Castilleia, No. 1; recorded as) Euchroma?. Annual; pubescent; leaves pinnatisect, the segments linear and very long; the upper leaves purple. In the upper portion of the region, along the ascent to Culuay.

(———? No. 2; recorded as) Euchroma? Three to six inches high, diffuse, many-stemmed, smooth; leaves 3–5-fid at the apex, the segments long, linear; a few large flowers. In the upper portion of the region, along the ascent to Culuay.

Gen. Rhinanthac? (No. 1). Leaves six to nine inches long and lyrately pinnatifid, but

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Mentha; leaves petioled, broad. Growing around Obrajillo, and elsewhere in the mountain-region; probably not indigenous.

alternate; flowers large and showy, orange-colored, crowded at the summit of the plant; the floral bracts broad; stamens four. In the environs of Obrajillo.

Salvia (compare No. 9 Yaso in Lower Peru). The basal portion of the stem smoothish; leaves broad at base; floral bracts narrower than in the next species; corolla scarlet, and very hairy. In the environs of Obrajillo.

——— (No. 10); leaves ovate, half an inch long, serrate; broad floral bracts; long scarlet solitary flowers. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 11); leaves petioled, broad-ovate; flowers blue, the corolla twice as long as the calyx. Abounding in the environs of Obrajillo, and elsewhere in the mountain-region.

——— sagittata, Ruiz & Pav. (No. 12). Ornamental; leaves hastate; the calyx and large corolla dark-blue. In the upper portion of the region, along the ascent to Culuay; rare.

Gen. Salvioid (No. 1). Leaves petioled, cordate, rugose, pubescent; five long acuminate calyx-teeth; tube of the corolla scarlet, an inch and a quarter long, terminating in slight obtuse segments. In the environs of Obrajillo.

Gardoquia? (No. 2). A shrub, three to six feet high; leaves an eighth of an inch long, involute, the under surface white; five equal calyx-teeth; corolla three-fourths of an inch long, terminating in short equal segments. Frequent in the environs of Obrajillo; and of Baños.

——— (No. 3). A shrub, three to five feet high; leaves fasciculate, short-petioled, half inch in length, broad-ovate, serrate; calyx long, cylindrical, striate, bilabiate, three upper segments and two lower ones; flowers an inch long, scarlet. Frequent along the upper margin of the region, at Baños.

Scutellaria? (No. 9). The flowers scarlet, and very showy, half an inch long, hairy. Frequent in the environs of Obrajillo, and elsewhere in the mountain-region.

Stachys? (No. 9). Six to nine inches high; pilose; leaves broad-ovate, crenate, the lower ones petioled; flowers small; five short pointed calyx-teeth. In the upper portion of the region, along the ascent to Culuay.

Lippia? (No. 2). A pretty and graceful shrub, three to ten feet high; capit. or spikes cylindrical, long; the calyx pubescent. In the lower portion of the region, growing one to two leagues from Obrajillo.

Lantana (No. 11). A "decumbent shrub," entirely pilose or hairy; the flowers "orange-colored." In the environs of Obrajillo.

Verbena (No. 18); leaves abruptly attenuate at base, incised; calyx-teeth elongate. In the environs of Obrajillo.

(Pœppigia?, No. 2. Having the habit of) Solanac., but with opposite spines; a rigid branching shrub, four to six feet high; leaves oblong, entire; five calyx-teeth; fruit a berry. In the upper portion of the region, along the ascent to Culuay.

(———?); perhaps not distinct; opposite spines and leaves; the leaves petioled, tomentose, broad-obovate, serrate at the apex; calyx 5-dentate, persistent; fruit a berry. In the upper portion of the region, along the ascent to Culuay.

Basella tuberosa, (No. 4); not seen in flower; the roots edible. (Of Aboriginal cultivation; and at the present day) abundantly planted in the upper portion of the region, as far as the Paramera.

Ruellia? (No. 15); long tubular flowers; the calyx short. In the lower portion of the region, along the ascent to Obrajillo.

Dicliptera? (No. 3); flowers crowded; corolla twice as long as the calyx, spreading at the summit. In the environs of Obrajillo.

Plumbago (compare No. 7 Amancaes mountain in Lower Peru). Leaves amplexicaul, auriculate at base; ornamental blue flowers. Frequent in the lower portion of the region, along the ascent to Obrajillo.

Plantago (No. 35); having the habit of P. major; pubescent; the leaves dentate. Along the upper margin of the region at Baños; and perhaps the same species, at Obrajillo.

——— (No. 36); leaves broad-lanceolate, dentate; flower-stem pubescent. In wet ground, from Obrajillo to the Paramera at Culuay.

——— (No. 37); leaves linear-lanceolate; the florets large. In the upper portion of the region, along the ascent to Culuay.

Boerhaavia (No. 15); pubescent, more diffuse than No. 13 Lima, and the leaves thinner; small purple flowers. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 16). An ornamental species, having a large purple corolla, two-thirds of an inch in length. Frequent in the lower portion of the region, along the ascent to Obrajillo. No specimens.

Gen. Nyctaginoid? (No. 1). Suffruticose, three to five feet high, spreading; ornamental from the white floral leaves; leaves opposite, petioled, broad-ovate, entire; axillary cymes; segments of the corolla deeply divided, or perhaps entirely separate?; the capsule 5-angled, but inferior; anthers two-celled. In the environs of Obrajillo.

Phytolacca (No. 5). A spreading shrub, four to six feet high; the leaves acute. In the environs of Obrajillo, somewhat rare.

Basella (No. 3). A vine, having broad-cordate leaves; the flower-branches somewhat naked. Frequent in the environs of Obrajillo.

Atriplex? (No. 11); or compare Chenopodium. Pulverulent; leaves hastate, entire; terminal branching panicles. In the upper portion of the region, along the ascent to Culuay.

Alternanthera? (No. 2; compare No. 1 Hindostan); leaves subsessile, broad; capit. small, sessile. In the lower portion of the region, along the ascent to Obrajillo.

Gomphrena? (No. 3); capit. purple. Frequent in the environs of Obrajillo.

——— (No. 4); capit. dark-purple, almost blackish. Frequent in the lower portion of the region, along the ascent to Obrajillo.

Gen. Gomphren? (No. 1). Alternanthera-like, thick, woolly; capit. small, sessile. In the environs of Obrajillo.

——— (No. 2). Alternanthera-like; yellow pubescence on the under surface of the leaves; capit. of flowers somewhat naked. In the upper portion of the region, along the ascent to Culuay.

(Helxine? No. 11). A climbing dock-leaved vine; the leaves cordate, pubescent beneath. In the lower portion of the region, along the ascent to Obrajillo.

Zea mays, (bis Chili and No. 1 Lower Peru); Indian corn. Cultivated in the lower portion of the region.

Polygonum (No. 34); having something of the habit of P. aviculare. Suffruticose, branching, three to eight inches high; ochreæ entire; the leaves broad. Frequent on rocks, in the environs of Obrajillo; and also, at Baños.

Quinchamalium (No. 3; compare No. 1 Chili); the leaves linear. In the lower portion of the region, along the ascent to Obrajillo.

Croton (No. 13). A shrub, two to three feet high; densely tomentose, and the fruit also tomentose; leaves broad, subrotund. In the lower portion of the region, growing about a league from Obrajillo.

Euphorbia (No. 47); like E. peploides. Many-stemmed, with a large tuberous root; leaves obovate, entire. At the upper margin of the region, at Baños.

Urtica (? No. 24). A shrub, four to six feet high; leaves an inch to one and a half inches long; flowers axillary, glomerate. In the lower portion of the region, growing in a ravine two leagues from Obrajillo.

——— (No. 25); leaves half an inch in length, short-petioled, narrow-ovate, plicate, dentate. At the upper margin of the region at Baños.

——— (No. 26); covered with stinging hairs; leaves small and crowded, broad, plicate, dentate. Around Baños, at the upper margin of the region.

Peperomia scutellæfolia, (bis No. 28 Amancaes mountain in Lower Peru). In clefts of rocks, at the upper margin of the region at Banos.

——— inequalifolia, (bis No. 29 Amancaes mountain in Lower Peru). In clefts of rocks, in the lower portion of the region, along the ascent to Obrajillo.

——— umbilicata, (No. 30). In clefts of rocks, at the upper margin of the region at Banos.

——— (No. 31); leaves simple, semicordate, as though typically cordate, but the two halves folded and soldered together by their upper surface. On rocks, in the lower portion of the region, along the ascent to Obrajillo.

Myrica (No. 9). Arborescent; twenty feet high. In the lower portion of the region, growing in a ravine two leagues from Obrajillo.

Ephedra (compare No. 1 Patagonia, Chili, and the Chilian Andes). In the Canta Valley, from Obrajillo to the Paramera.

Gen. incert. (No. 1). A shrub; leaves alternate, evergreen, short-petioled, lanceolate, entire, and while young tomentose; the flowers and fruit not seen. In the environs of Obrajillo.

Habenaria? (No. 16); leaves broad-lanceolate, acute at each end; long acute floral-bracts; the flowers not seen. In the upper portion of the region, along the ascent to Culuay.

Gen. Goodyera-like (No. 1). Six to eight inches high; leaves lanceolate; the flower-stem separate from the leaves, full of scarious (or membranaceous) sheaths; flowers in a dense raceme. In the middle of the region around Obrajillo.

Amomum? racemosum, (No. 4); see Ruiz & Pav. Leaves attenuate at base, lanceolate; flower-stem separate from the leaves; flowers red, "with an orange tinge." In the lower portion of the region, growing about a league from Obrajillo.

Sisyrinchium (No. 17). Spathe much exceeding the leaves; flower single, rose-colored. Frequent in the lower portion of the region, along the ascent to Obrajillo.

Echinochloa crus-galli? (compare our Atlantic States, and No. 1 California). In the environs of Obrajillo.

Gen. Anthericum-like (No. 1). A long branch. raceme; capsule half an inch in length. Frequent in the lower portion of the region, along the ascent to Obrajillo.

Alstroemeria (No. 6). Large; the floral leaves larger than the others. Growing in the Canta Valley, from Obrajillo to the Paramera at Culuay.

——— (No. 7); leaves narrow-lanceolate; corolla an inch long, not spreading at the summit; sepals shorter than the petals, obtuse. Along the upper margin of the region at Baños.

Agave? (No. 1); leaves two feet or more long, stout, full of fibres, the margin serrulate; flower-stem slender, ten to twenty feet high. Making a striking display at the commencement of the region and of the rains; crowning the rocks as far as distinguishable up the steep mountain slopes.

Bromelia? (No. 18); leaves white beneath, the margin with a few straight prickles; the bracts prickly. In the lower portion of the region, along the ascent to Obrajillo; and perhaps the same species, at Baños.

Tillandsia (No. 15); having large and broad leaves; the bracts large. On rocks in the upper portion of the region, along the ascent to Culuay.

——— (No. 16); the smallest species; the flower single. On shrubs and on Cacti in the lower portion of the region, along the ascent to Obrajillo.

——— (No. 17); scurfy; the leaves broad at base; bracts broad; the flowers yellow. In the upper portion of the region, along the ascent to Culuay.

——— (No. 18); leaves subulate; flowers single.

——— (No. 19); near the last species; leaves involute, subulate; a short stem, with a single flower. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 20); covered with long wool, or rather chaffs; red spikes, the flowers blue. In the lower portion of the region, along the ascent to Obrajillo.

Commelina (No. 20). Large; the spathes slightly hairy; flowers larger than in Callao sp. (In the upper portion of the region, along the ascent to Culuay).

Juncus (No. 40); like J. bufonius, but only an inch high. In wet ground in the upper portion of the region, commencing about three leagues beyond Obrajillo.

Eleocharis (No. 18.) Many-stemmed, two to three inches high. In the upper portion of the region, along the ascent to Culuay.

Cyperus (No. 45). Three to five feet high; a compound umbel; the spikelets blackish. In the environs of Obrajillo.

Paspalum (No. 15). Two to three feet high, and having the habit of Ceresia; the florets elliptical. In the environs of Obrajillo.

——— (No. 16); having the same habit. Six to ten inches high; the rachis narrow. In the environs of Obrajillo.

Setaria (No. 6); corolla-glumes minutely corrugated. In the environs of Obrajillo.

Gen. Setarioid (No. 1). Sheaths hairy; a white spike. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 2); a second species. Branching, four feet high; the sheaths smooth; a very small outer glume to the calyx. In the environs of Obrajillo.

Nov. gen.? Panicoid (No. 2); a congener of No. 1 Chili. Corolla-glum. coriaceous, obtuse, at apex, awned. In the environs of Obrajillo.

Polypogon (compare Chili, Patagonia, and No. 1 Europe). In the environs of Obrajillo.

Stipa (No. 20). Six feet high, branching; awn plumose. In the environs of Obrajillo.

Aristida (No. 21). Annual, six to nine inches high; stems simple, not branching; florets having the awns nearly equal. In the lower portion of the region, along the ascent to Obrajillo.

Gen. Trichochloa-like (No. 1); near Stipa agrostoides; the calyx-glumes very short. (In the lower portion of the region, along the ascent to Obrajillo.)

Gen. Agrostoid? (No. 1; Deschampsia-like, but) the florets single. Habit of Trisetum; three to six inches high; panicle dense and raceme-like as in Aira cespitosa; corolla awned on the back. In the environs of Obrajillo.

Gen. Arundo-like (No. 1). Three to five feet high; panicle crowded; calyx-glumes long, containing about six florets, with long hairs intermingled. On the banks of streams in the upper portion of the region, along the ascent to Culuay.

Atheropogon (No. 2); a congener of A. oligostachyum? Annual; three to six inches high; a single spike. Frequent in the lower portion of the region, along the ascent to Obrajillo.

Poa (No. 24); like P. viridis. Two to three feet high; spikelets of four florets. In the environs of Obrajillo.

Eragrostis (No. 28; compare No. 27 Lower Peru); near E. pilosa. Sheaths hairy; florets congested or crowded in a dense panicle. In the environs of Obrajillo.

———; perhaps not distinct (from No. 28); long hairs on the stem and sheaths; the panicle diffuse. In the environs of Obrajillo.

Melica (No. 5). One to two feet high; the stem scabrous; spikelets smooth. In the environs of Obrajillo.

Festuca (No. 14); having short awns. Growing in the environs of Obrajillo; and perhaps the same species, at Baños.

——— (No. 15). Two to three feet high; the spikelets smaller; the awns short. In the environs of Obrajillo.

Bromus (No. 10); stem and leaves smooth; florets scabrous, awned. Growing in the environs of Obrajillo.

——— (No. 11). Annual; six to eight inches high; spikelets sometimes Stipa-like with only two florets, and sometimes with as many as five florets; long awns. In the environs of Obrajillo; and perhaps the same species at Baños, but two to three feet high, with a spreading panicle.

Elymus (No. 16). One to two feet high. Growing along the upper margin of the region, at Baños.

Equisetum (No. 12). Clustered; three to four inches high. In the upper portion of the region, along the ascent to Culuay.

Festuca bromoides? (of Europe); or perhaps, an indigenous allied species. In the upper portion of the region, towards Culuay.

Hordeum vulgare, (bis Mocha, Egypt, and No. 1 Northern Asia); barley. Under cultivation in the vicinity of Obrajillo.—Wheat (Triticum) was not seen cultivated; and we were told, "that the flour used at Obrajillo was brought from Lima."

Sorghum (Halepense?; compare Callao in Lower Peru, and No. 1 East Indies). One to two feet high. Growing in the environs of Obrajillo.

(Nov. Gen.; No. 3); Lycopodium of authors. (A congener of, and closely) resembling L. rupestre; margin of the leaves or leaf-scales slightly ciliate. On rocks, at Obrajillo and elsewhere in the mountain-region.

"Nothochlæna?" (No. 1). Frond bipinnatifid, green above, the under surface covered with scales. In the environs of Obrajillo.

Polypodium (No. 55; compare No. 47 Oregon and California). Like P. vulgare, but a stout, creeping rhizoma. In the upper portion of the region, along the ascent to Culuay, and in other localities.

——— (No. 56). Six to twelve inches high; the frond lanceolate, entire. In the environs of Obrajillo.

Cheilanthes (No. 14). Twelve to eighteen inches high; chaffy, with a long stipe; frond rariter pinn., the segments like so many granules. In clefts of rocks, in the environs of Obrajillo.

Gen. Cheilanthes-like (No. 1). Six inches high; pubescent; frond white beneath, the segments a third of an inch, 3–5-cleft, involute. In the lower portion of the region, along the ascent to Obrajillo.

——— (No. 2); a second species. Four to six inches high; densely tomentose; segments a fourth of an inch, much divided. In the environs of Obrajillo.

Adiantum (No. 31); cuneate segments. In the environs of Obrajillo.

——— (No. 32); reniform segments. In the environs of Obrajillo.

Pteris "ternifolia," (compare No. 17 Hawaiian mountain-region). In the environs of Obrajillo, and in other localities.

——— (No. 46); a foot high. Growing in the environs of Obrajillo.

——— (No. 47); eight inches high; the under surface of the frond sulphur-yellow. In the lower portion of the region, along the ascent to Obrajillo; rare.

———? (No. 48); or compare Cheilanthes. Four inches high; frond white beneath, pinnate, the segments one-tenth of an inch long. In the environs of Obrajillo.

Asplenium (No. 61); perhaps distinct. Twelve to eighteen inches high; frond with the segments more dissected. At the upper margin of the region at Culuay.

Aspidium? (No. 36). One to two feet high; the stipe chaffy; frond bipinnate, the segments trapeziform; shields not seen. In clefts of rocks, at the upper margin of the region at Baños.

"Cystopteris?" (No. 3). Like Aspidium tenue; eight to ten inches high. In the environs of Obrajillo.

Woodsia? (No. 6). Four to six inches high; slightly pubescent. In the environs of Obrajillo.

Marchantia (No. 10; compare Chili). "Baños, and elsewhere," Rich.

Hepaticæ. Seemed in fair proportion; but they did not receive special attention.

Musci incerti. Mosses of different genera seemed in fair proportion; but they did not receive special attention.

Cetraria (No. 4); near, or somewhat like C. Icelandica; whitish. In the environs of Obrajillo.

Lichenes incerti. Other kinds of Lichens seemed in fair proportion; but they did not receive special attention.

Fungi. The larger species, according to my recollection, (when writing my journal) not so entirely excluded as from Lower Peru.

4. The Peruvian Paramera, or Grassy Subalpine Region.

From the time of our first proposing a visit to the Andes, we heard accounts of the dreaded Paramera, "uninhabitable on account of the cold;" and, in all instances, owners declined sending their mules "into the Paramera and over the mountains."

In ascending the Andes, the Chilian order of aridity was found to be reversed; moisture increasing, until at length the soil was entirely concealed by herbage. The result is, that in Peru, the crest of the Andes is no longer a barrier and political boundary between nations; but barely separates the two portions of a pastoral district, that serves as a bond of union between the population on either slope.

On the 19th of May, we passed the hamlet of Culuay, at 10¼ A. M.; and a little beyond, the large shrubs and gaudy flowers very abruptly ceased; the soil, hitherto left partly bare, becoming thickly covered with low herbage, everywhere green and grassy. Cultivation having also ceased; cattle were seen grazing on the heights around, together with donkeys, lamas, and numbers of sheep and goats.

Whether snow ever falls as low down in the Paramera as the commencement or LOWER MARGIN, we did not ascertain. The following Observations of the temperature were made by us at two stations on this margin:

May 22d, at Baños (in the Chancay Valley); near sunset, in the open air, 50° Fahr.
" " at night within doors, ... 50° Fahr.
23d, " frost observed this morning, ...
25th, one league above Culuay (in the Canta Valley); at 7 A.M., . 47° Fahr.

As we continued ascending, *Grasses* predominated everywhere, to the exclusion often of all other kinds of herbage; conspicuous flowering plants occurring only singly at wide intervals, besides being reduced almost entirely to *Senecioneæ* and dwarf *Lupines*. The average height of the herbage seemed about six inches, and the extreme height rarely a foot; the shrubs that were occasionally intermingled, conforming in dimensions; but beyond the depressed harmonizing species of *Baccharis*, shrubs in the Paramera were almost entirely confined to the crevices and shelter of rocks.

The vegetable growth was soon found to consist mainly of the genera of the extreme North: the *grasses*, almost all of them, belonging

to familiar NORTHERN genera; *Bartsias* and *Astragali* proving exceedingly abundant, together with *Valerians* and *Gnaphaliums; Hieraciums* and other *Lactuceæ* occurring here and there; also *Gentians; Juncaceæ*, including a *Luzula; Drabas*, and other *Cruciferæ;* inconspicuous species of *Caryophyllaceæ; Erigerons;* an *Epilobium;* various *Plantagos; Ranunculi;* an *Anemone; Ribes; Carex;* and several species of *Aphanes.*

Most unexpectedly, in a climate that had become essentially moist, the *Chuguiraga* made its appearance; discordant and out of place, as though created for a different home; and in fact, proving almost the only spinescent plant in the Paramera. There was little else in common with the AUSTRAL Andes, where visited in Chili; the only traces of resemblance being the continued presence of *Aldea, Ephedra,* species of *Senecio,* and of *Baccharis.*

In the midst of the above-described vegetable growth in this chill wintry climate, a few TROPICAL PLANTS were lingering; as a *Bromelia,* extending fairly into the Paramera; two species of *Peperomia,* in the clefts of rocks; and a lanate *Cactus,* lying in small bundles to the height of six inches or more, seen only within the limits of the Paramera.

Above Culuay, there is a bend in the Canta Valley; and at the end of about a league, we obtained for the first time since leaving the coast a view of the Andes. The Peak in sight was called "La Vidua," and was situated at the head of the Valley; its black tracts of rock mid the pure white snow contrasting finely with the freshly-green country out of which it rose. After ascending two leagues farther, the vegetable growth became sensibly more depressed; evidence, to a botanist at least, that we had reached the border of the alpine region. We estimated the elevation at about fourteen thousand feet; making the width of the Western division of the Paramera, where we crossed, about nine geographical miles.

Two days afterwards, from a point some leagues farther North, we descended the Chancay Valley to BAÑOS; and the declivity being steeper, the Western division of the Paramera proved there only six geographical miles wide. In both instances, we followed the bottom of a deeply-sunken ravine-like valley: upon the summit of intervening ridges, the Paramera is doubtless much wider.

The third day, I reascended from Baños; not by the bottom of the ravine, but by the Northern flank; like the opposite one, rugged,

immensely elevated, and so steep as to have caused inquiry, "Why the cattle do not fall off." I continued climbing, rather leisurely, until noon; when having reached a position hardly less than three thousand feet above the village, I looked out of the ravine into the sky; and counted eight transverse successively-diminishing ridges interposed before the place of the sea; the distance being too great for the sea itself to be distinguishable. The mass of matter is so enormous in the Andes, that living on the slope may be compared to living on the side of the globe instead of on its top; as though the horizon itself were inclined, fifty degrees or more. Notwithstanding the elevation I had attained, the plants as yet presented no traces of the alpine habit of growth; so that this day's excursion served as a gauge or measure of the extent and limits of the botanical region. The vegetable growth proved in all respects similar to that in the Canta Valley above Culuay.

Negative Characters. Among the points of difference from the mountain-region below, *annual plants* became rare or ceased altogether on entering the Paramera. The gaudy Cordillera tribes, as Mutisias, Tacsonias, Tropæolums, Loasas, and scarlet Salvias ceased; and even the *Calceolarias* became rare. Many genera of *Compositæ* and *Leguminosæ* either ceased or became rare; *Solanaceæ*, so characteristic below, were now extremely rare; as also *Labiatæ*, *Nyctaginaceæ*, and *Amaranthaceæ*.

The continued rarity of *Cyperaceæ*, and especially of the genus *Carex*, seemed remarkable. *Orchidaceæ* were not met with; but occurring higher up as well as lower down, are probably not altogether absent. On the other hand, Saxifrageæ did not appear to extend downwards from the alpine ground into the Paramera.

Paronychiaceæ and *Gentianaceæ* made their first appearance in the Paramera; the only acquisitions, or Tribes of plants gained on ascending out of the mountain-region. On the other hand, deficiencies were numerous in the disappearing of

Linaceæ,	the tribe Asclepiadeæ,	Salsolaceæ,
Tropæolaceæ,	Bignoniaceæ,	Phytolaccaceæ,
Polygalaceæ,	Convolvulaceæ,	Santalaceæ,
Cucurbitaceæ,	Verbenaceæ,	Euphorbiaceæ,
Portulacaceæ,	Acanthaceæ,	Scitaminaceæ, and
Crassulaceæ,	Plumbaginaceæ,	Iridaceæ.

Composition of the Vegetable Growth. There seemed to be but

three prevailing Tribes of plants in the Paramera; occurring in the following order of frequency:

1. *Graminaceæ.* Dominant; and giving a grassy character to the whole region, as already mentioned.

2. *Compositæ.* Consisting principally of *Senecio-like* plants of various affinity, and of species of *Baccharis.*

3. *Leguminosæ.* Consisting, perhaps exclusively, of *Astragali* and *Lupines;* genera, it will be observed, that are essentially Northern.

Five additional Tribes of plants were, however, abundant; continuing the order of frequency thus:—4. *Rhinanthaceæ,* consisting principally of *Bartsieæ;* 5. *Valerianaceæ;* 6. *Caryophyllaceæ;* 7. *Plantaginaceæ;* 8. *Geraniaceæ.*

Small species of *Ferns* continued frequent; but were confined, even more exclusively than below, to clefts in the rocks.

The following plants were found growing in the Paramera; the cold and grassy region between the limit of cultivation and the alpine ground, or from the elevation of ten thousand feet to that of fourteen thousand:

Anemone (No. 9); having the habit of A. nemorosa. Twelve to eighteen inches high; the stems leafy at the summit; leaves triternate, incised; flowers white. In the Chancay Valley, at the commencement of the Paramera "at Baños," Rich.*

Ranunculus (No. 27); long hairs; leaves multifid; sometimes as many as ten petals, which are obtuse or even notched; carpels beaked. In the Paramera, along the ascent from Baños.

——— (No. 28). Creeping and inconspicuous, projecting about an inch above the soil; leaves reniform, entirish; the carpels mutic. In the upper portion of the Paramera, growing two and a half leagues beyond Culuay.

Arabis? (No. 17). Four to six inches high; leaves obovate, dentate; flowers small, white; pod half an inch long. In the Canta Valley, growing in the Paramera along the ascent from Culuay.

———? (No. 18). Six inches high; stems decumbent at base; leaves spatulate, small, obovate, entire; pod fusiform, half an inch in length. In the Chancay Valley, growing in the Paramera along the ascent from Baños.

———? (No. 19); base of the stem shrubby; leaves attenuate, oblong, paucidentate; flowers white; pod short. Frequent in clefts of rocks in the Paramera, along the ascent from Baños.

Cardamine (No. 14); near C. hirsuta. From Culuay up the Canta Valley to the alpine region.

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* Sisymbrium (athrocarpum of Gray; bis No. 10 lower down, in the mountain-region; near No. 6 Mount Rainier ridge in Oregon), and S. canescens. Growing spontaneously throughout the Paramera to the alpine region; (perhaps not in every instance indigenous).

Draba (No. 4). One to three inches high; pod pubescent, obtuse. In the Paramera, along the ascent from Culuay.

——— (No. 5); pod smooth, twisted, somewhat pointed. In the Paramera, along the ascent from Culuay.

——— (No. 6); having the habit of D. arabisans. Three to six inches high; leaves mostly radical, oblong, attenuate, obtuse, half an inch in length; pod broad, acute. In the Paramera, along the ascent from Baños.

Sagina? (No. 4). One to two inches high; much-branched; leaves pilosiuscul.; flowers numerous. In the Paramera, along the ascent from Baños.

Cherlerioid (No. 1). In the Paramera, along the ascent from Baños.

(Melandrium, No. 2); Lychnis of authors, and near L. dioica. Six to nine inches high; pubescent; the leaves lanceolate; a single terminal flower; calyx large. From Baños up the Chancay Valley to the alpine region.

(Malvastrum?) acaule? (No. 5); see Malva of Cav. Stemless; leaves petioled, roundish, dentate; flowers one-fourth of an inch, congested; the segments of the outer calyx linear. In the Paramera, along the ascent from Baños.

Lupinus (No. 28); having the habit of L. villosus. A foot high; stem white-lanate; leaflets from nine to eleven; an upright densely-crowded raceme of light-blue flowers. In the Paramera, along the ascent from Baños.

——— (No. 29); sericeously pilose. Dwarf; stems two to three inches long, recurved; five to six broad leaflets. In the Paramera, along the ascent from Baños.

——— (No. 30). One to three inches high; stunted, pubescent; seven leaflets; pod hairy. From Culuay up the Canta Valley to the alpine region.

Astragalus (No. 21). Smoothish; eight to twelve inches high; the flowers cream-colored. Abounding in the Paramera, along the ascent from Baños.

——— (No. 22); the rachis or mid-rib of the leaves persistent, and becoming spinescent. Above Baños, on the sloping summit of the ridge that forms the Northern border of the Chancay Valley; rare.

———? (No. 23). Villous; the leaves rather large, with twelve to fourteen pairs of narrow leaflets; racemes shorter than the leaves; flowers small; the calyx covered with black pubescence; the pod one-fourth of an inch long, inflated. In the Paramera, along the ascent from Baños.

Aphanes (No. 4); argenteo-pilose. Stem two inches, prostrate; radical leaves pinnatisect, the segments acute, an eighth of an inch long, each with an appendage, so as to make four rows; eight calyx-teeth. In the Paramera, along the ascent from Baños.

——— (No. 5). Sibbaldia-like, procumbent, branching; leaves Potentilliform, the leaflets about five, and incised; six to eight calyx-teeth; no petals. In the Paramera, along the ascent from Baños.

———? (No. 6). Dwarf; cespitose. Frequent from Baños up the Chancay Valley to the alpine region. Not catalogued.

Acæna? (No. 8). Sheaths and petioles hairy; leaflets ternate, cuneate, serrate, obtuse; the flowers not seen. At the commencement of the Paramera at "Baños," Rich.

Gen. Rosac? (No. 3); a congener of sp. of Chilian Andes. A shrub, three to six inches

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Gnaphalium (luteo-album?; compare Hawaiian mountain-region, New Zealand, Australia, and Europe); incano-lanate; the flowers yellow. In the vicinity of Baños.

high, rigid, Margyrocarpus-like, and having the habit of Polygonum; leaves simple, linear, crowded; capsule five-angled; margin of the fruit dentate. In the Paramera, along the ascent from Baños.

Epilobium denticulatum, Ruiz & Pav. (No. 22). In the Paramera, growing along banks of streams in the Canta and Chancay Valleys.

Myriophyllum? (compare No. 2 Oregon, California, and Chili); like M. verticillatum. Aquatic; growing in streams at the commencement of the Paramera at Culuay.

Paronychia? (No 4). Growing in dense tufts; the leaves larger, and the pointed stipules more numerous than in the alpine species to be mentioned presently. In the Paramera, along the ascent from Baños.

Sesuvium? (No. 3); but a smaller plant, and small purple flowers. Prostrate; the leaves linear, ciliate; capsule three-valved. In the lower portion of the Paramera, along the ascent from Culuay; perhaps belonging properly to the mountain-region lower down.

Nov. gen. Cactac. (bis No. 1 mountain-region). Extending very slightly, if at all, into the Paramera at Culuay.

——— (No. 2); a second species. Stems recumbent on each other in small bundles, to the height of eight inches above the soil; less woolly than the alpine species to be mentioned presently, and the fruit smaller; large stony seeds. In the upper portion of the Paramera, growing two and a half leagues beyond Culuay.

Ribes cuneifolium, Ruiz & Pav. (No. 17). A stunted, straggling shrub; fruit sessile, mostly solitary. In clefts of rocks in the Paramera, in the Canta and Chancay Valleys.

Fragrosa multifida, Ruiz & Pav.? (No. 4). Social and loosely cespitose, the leaves appressed to the ground; the flowers not seen. Frequent from Culuay up the Canta Valley to the alpine region.

——— cladorhiza, Ruiz & Pav.? (No. 5); similar in habit; the leaves spatulate, with about six long acuminate dentures, and long hairs on the upper surface. In the Paramera, along the ascent from Baños.

(Oreomyrrhis? No. 1; recorded as) Ferula?. Leaves multifid; umbels simple, the involucral leaves numerous, incised; the fruit pubescent. In the Paramera, along the ascent from Baños.

Galium (No. 25). Three to four inches high, many-stemmed, with a woody root; leaves verticillate in fours, cartilaginous, one-eighth of an inch long, ciliately-pilose; fruit smooth. In the Paramera, along the ascent from Baños.

Valeriana (No. 11); leaves spatulate, lanceolate, obtuse; stem leafless, six to ten inches high; whorls crowded in a dense terminal raceme. In the Paramera, along the ascent from Baños.

——— (No. 12); leaves linear, obtuse, minutely ciliate; stems entirely naked or leafless, six to eight inches high; the whorls forming an interrupted spike. In the Paramera, along the ascent from Baños.

——— (No. 13); leaves deeply pinnatisect; stem or scape leafy; a branching panicle of densely-clustered flowers. Above Culuay?.

——— (No. 14). Many-stemmed, four to ten inches high; leaves mostly radical, pinnately-multifid. In the Paramera, along the ascent from Baños.

Hieracium (No. 17); long hairs. In the Paramera, along the ascent from Culuay.

——— (No. 18). Having the habit of H. venosum; long hairs on the leaves; small flowers; the calyx with long blackish hairs. In the Paramera, along the ascent from Baños.

(Chuquiraga No. 3); leaves small, shining; flowers orange-colored. Commencing at Culuay, and frequent in clefts of rocks and other situations throughout the Paramera to the alpine region.

Gen. Tripolium-like, (No. 1); but the leaves mostly radical, with the flower-stem of two or three inches, decumbent at base, and having Tussilago-like scales. Leaves smooth, ovate, entire, the petiole winged; calyx-scales in at least two series; the floret-rays short. Growing above Culuay.

Gen. Conyza-like, (No. 1); with something of the habit of Senecio. Twelve to eighteen inches, decumbent at base; leaves deeply pinnatisect, the lobes rounded, obtuse; flowers glomerate in a long and interrupted raceme; calyx-scales uniserial, numerous, acute. In the Paramera, along the ascent from Baños.

Perezia ? (No. 2). A foot high; thistle-leaved; calyx-scales spinescent; flowers "bluish-white;" no floret rays. Growing above Baños, and elsewhere in the Paramera.

——— ? (No. 3). Six to ten inches high, slender; radical leaves petioled, oblanceolate, with large dentures; cauline leaves amplexicaul; calyx-scales acuminate. In the Paramera, along the ascent from Baños.

(Trixis ?, No. 1); gen. Senecioid. Stemless; leaves two to three inches long, lyrately pinnatisect, the under surface white-tomentose; long yellow floret-rays. In the Paramera, along the ascent from Baños.

(Ptilurus daucifolius ?, No. 1); gen. Senecioid. Leaves bipinnatisect; stem half an inch high, terminating in a single large discoidal flower; calyx-scales biserial, the outer ones linear. In the Paramera, along the ascent from Baños.

(Leuceria ?, No. 1); gen. Senecioid. Very coarsely herbaceous; entirely tomentose and glutinous; leaves lyrately pinnatifid; large discoidal flowers. In the Paramera, along the ascent from Baños.

(Homoianthus ?, No. 1); gen. Senecioid. One to two feet high; leaves succulent, oblong-lanceolate, with the few dentures half an inch long; calyx-scales 2–3-serial, lax, broad, obtuse, the outer ones somewhat serrulate. In the Paramera, growing above Culuay.

Gen. (Labiatiflor. ? No. 1); gen. Senecioid. Six to eight inches, decumbent; leaves crowded, one-third of an inch by one-tenth, with few dentures; flowers large, discoidal or devoid of floret-rays; calyx-scales biserial, tomentose. In the Paramera, along the ascent from Baños.

——— (No. 2); a second species. One to two feet high, somewhat succulent; the leaves linear, denticulate; flowers clustered at extrem., smaller than in the first species. In the Paramera, along the ascent from Baños.

——— (No. 3); a third species. A rigid shrub, a foot high, smooth; leaves one-third of an inch long, dentate; flowers smaller than in the first species; the calyx-scales smooth. In the Paramera, along the ascent from Baños.

——— (No. 4); a fourth species. A rigid branching shrub, a foot high, with branching spines; leaves fasciculate, linear with a few dentures, involute; flowers solitary; cottony. From Baños up the Chancay Valley to the alpine region.

Gen. (Leucerioid ? No. 1); gen. Senecioid. Leaves radical, succulent, linear, three to nine inches long, the under surface white; scape bearing from two to five discoidal flowers; calyx-scales biserial, spreading. In the Paramera, along the ascent from Baños.

——— (No. 2); a second species. A foot high, somewhat cottony; leaves succulent,

lanceolate, tapering or narrower at the summit, entire; four to six flowers; the calyx-scales biserial. In the Paramera, along the ascent from Baños.

Erigeron (No. 16); like E. nudicaule. Pubescent, with attenuate, lanceolate, entire leaves; but the root woody. In the Paramera, growing above Baños.

——— (No. 17); a second species. In the Paramera.

———? (No. 18). Herbaceous, and almost stemless, only one to two inches high; pilose; leaves attenuate, obovate, obtuse, the margin undulate; flowers rather large. In the Paramera, along the ascent from Culuay.

Baccharis (No. 28); like B. artic. Aphyllous, trialate, glutinous; the flowers lateral, and also glutinous. Growing above Baños; but perhaps belonging properly to the mountain-region, lower down.

——— (No. 29). Stunted, and decumbent; leaves glutinous, broad-cuneate, with two or three terminal dentures; flowers large, solitary, axillary, crowded at the summit of the branches. In the Paramera, along the ascent from Baños.

——— (No. 30). A shrub; the leaves broad-obovate, with a few dentures; flowers crowded at the summit of the branches. In the Paramera, along the ascent from Baños.

——— (No. 31). Dwarf; leaves cuneate, the apex with about three dentures. Growing above Baños, and elsewhere in the Paramera.

Gnaphalium (No. 56). Six to ten inches high; stem mostly simple; leaves linear-lanceolate; flowers small, yellowish, in crowded terminal fascicles. In the Paramera, along the ascent from Baños.

——— (No. 57). Growing in beds, an inch high; leaves lanate, obovate; flowers solitary, elongate, with brown scales. In the Paramera, growing above Baños.

Senecio? (No. 38). Leaves succulent?, crowded, lanceolate, dent.; flowers small. In the Paramera, along the ascent from Culuay.

———? (No. 39). Suffruticose; one to two feet high, branching, somewhat tomentose; leaves linear, an inch to an inch and a half long; flowers scattered at summ. branches, corymbose; calyx with scale-like bracts at base. In the Paramera, along the ascent from Baños.

——— (No. 40); a third species. In the Paramera.

——— (No. 41); a fourth species. In the Paramera.

——— (No. 42); a fifth species. In the Paramera.

Gen. Rudbeckioid, (bis No. 1 mountain-region); compare Siegesbeckia flosculosa. In the Paramera, growing above Baños.

Pratia (No. 3); compare Lysipomia of Kunth. Leaves petioled, ovate, an eighth of an inch long. In the Paramera, along the ascent from Baños.

Gen. Roella-like, (No. 1). Three to six inches, slender, procumbent; leaves a fourth of an inch, oblong, slightly denticulate; calyx hairy at base, terminating in five large, leafy calyx-teeth; corolla not seen. In the Paramera, along the ascent from Baños.

Gentiana (No. 14, and No. 4 with spreading corolla). Many decumbent stems, six to eight inches in length; corolla pale-blue, spreading; calyx-segments recurved. From Baños up the Chancay Valley to the alpine region.

(Halenia) umbellata, (No. 2); Swertia of Ruiz & Pav. From Baños up the Chancay Valley to the alpine region.

Aldea pinnata, Ruiz & Pav. (bis No. 2 Chili, the Chilian Andes, and lower down in

Peru to the base of the Andes). Throughout the Paramera, from Culuay and Baños to the alpine region.

Gen. Myosotoid, (No 1). Prostrate; leaves linear, three-fourths to one and a half inches long by one-tenth wide, obtuse; flowers axillary, crowded while young at the summit. Growing above Culuay and Baños, and elsewhere in the Paramera.

Solanum (bis No. 58 lower down, in the mountain-region); near S. tuberosum. In the lower portion of the Paramera, along the ascent from Baños.

Gen. Atropoid? (No. 1); having the habit of Allionia. Herbaceous, straggling, almost creeping, many-stemmed; leaves alternate, pubescent, petioled, cordate, a fourth of an inch in length and breadth, entire. Growing in clefts of rocks in the Paramera, above Baños.

Calceolaria (bis lower down). One or more of the above-named species extending sparingly into the Paramera, at Baños.

Bartsia? (compare No. 2 lower down, in the mountain-region). In the Paramera, along the ascent from Baños.

———? (No. 3); entirely tomentose; leaves narrow-oblong, crenate; flowers small. In the Paramera, along the ascent from Baños.

(Castilleia, No. 3; recorded as) Euchroma; a third species. Pilose; with large flowers, the tube of the corolla slender. In the Paramera, along the ascent from Baños.

Gardoquia? (bis No. 3 lower down, in the mountain-region). Extending a short distance into the Paramera, at Baños.

Gen. Stachys-like, (No. 1). Six to ten inches high, entirely tomentose; leaves a fourth of an inch in length, broad and serrate; calyx-teeth acuminate or spinescent. In the Paramera, growing above Baños.

Plantago (No. 38); leaves linear, incano-tomentose; scapes four to eight inches high, the spike few-flowered. In the Paramera, along the ascent from Culuay; and perhaps the same species, at Baños.

——— (No. 36); perhaps distinct. Sericeous; leaves linear; scapes an inch high, the spike 2–5-flowered. In the Paramera, along the ascent from Baños.

——— (No. 40); leaves broad, entirish, ciliate; the florets pubescent. In the Paramera, along the ascent from Baños.

Urtica (No. 27); crowded leaves, covered with hairs. Vicinity of Baños.

Parietaria (No. 7); closely tomentose; leaves broad-ovate, a sixth of an inch in length and width. In the Paramera, along the ascent from Culuay.

Peperomia scutellæfolia, (bis No. 28 lower down, on the Andes, and on the Amancaes mountain in Lower Peru). In clefts of rocks in the Paramera, above Baños.

——— umbilicata, (bis No. 30 lower down, in the mountain-region). In clefts of rocks in the Paramera, above Baños.

Ephedra (bis No. 1 Patagonia, Chili, the Chilian Andes, and lower down on the Peruvian Andes). Growing throughout the Paramera to the alpine region.

Sisyrinchium (No. 18); having the habit of N. American sp. Two to five inches high, the stem alate; spathe not longer than the pedicel. In the upper portion of the Paramera, growing about two leagues beyond Culuay.

Alstroemeria (No. 8). Three to ten inches high, slender; the leaves linear, involute; the flowers not seen, but according to Mr. Matthews, "solitary." Growing above Baños, and in other portions of the Paramera.

Bromelia? (compare No. 18, below Obrajillo in the mountain-region). Extending a short distance into the Paramera, at Baños.

Luzula (No. 11; compare No. 9 Terra del Fuego); like L. spicata. Six to nine inches high; long hairs on the stem. Frequent above Baños, and in other portions of the Paramera.

Juncus (bis No. 40 lower down, in the mountain-region). Extending two leagues beyond Culuay, or as far as the upper portion of the Paramera.

Carex (No. 86). Three to five feet high; having the habit of C. atrata; but as many as sixteen spikes, all androgynous, male at the apex; carpels obtuse, shorter than the blackish scales. Growing above Culuay; rare; perhaps belonging properly lower down, to the mountain-region.

——— (No. 87); having the habit of C. ovalis. Three to six inches high; spikelets about five at summit; scales acute. In the Paramera, growing above Baños; rare.

Stipa (No. 21). Twelve to eighteen inches high; having the habit of Calamagrostis; florets very small, only an eighth of an inch in length. In the Paramera, along the ascent from Baños.

Agrostis (No. 36). Three to six inches high; panicle coarctate, the florets very small. In the Paramera, along the ascent from Baños.

Gen. Calamogrostoid, (No. 1). Eighteen inches high, cespitose, the radical leaves upright; calyx smooth; hairs at the base of the corolla; a geniculate awn. In the Paramera, growing above Culuay.

——— (No. 2); a second species. Twelve to eighteen inches high; the glumes longer. Vicinity of Baños?

Gen. Calamagrostis-like, (No. 1). Twelve to eighteen inches high; panicle congested; calyx-glumes long, the corolla-glumes very short, with hairs at the base; no awns. In the Paramera, along the ascent from Baños.

Trisetum (compare Terra del Fuego, and Chilian Andes); like T. subspicatum. Six to twelve inches high; the florets smooth. In the Paramera, along the ascent from Baños.

Poa (No. 25). Having the habit of P. alpina; large loose sheaths; the florets large. In the Paramera, along the ascent from Baños.

Festuca (No. 16). Twelve to eighteen inches high; the florets small, no awns. In the Paramera, along the ascent from Baños.

Acrostichum? (No. 19). Nine to twelve inches high; a long stipe, with the frond lanceolate; fructification not seen. In clefts of rocks in the Paramera, above Baños.

"Nothochlæna?" (No. 2). Three inches high, densely covered with chaffs; the fructification not seen. In clefts of rocks in the Paramera, above Baños.

Asplenium (No. 62); pinnulæ very tenderly herbaceous, a third of an inch long, cuneate, undulate. In clefts of rocks in the Paramera, above Baños.

——— (No. 63). Three inches high; frond dissected, the segments cuneate. In clefts of rocks in the Paramera, along the ascent from Baños.

——— (No. 64); near A. trichomanes; the segments broad, unequal. In clefts of rocks in the Paramera, along the ascent from Baños.

Polytrichum (No. 11); a large woolly calyptra. In the Paramera, along the ascent from Baños.

5. The Alpine Region of the Peruvian Andes.

On the 19th of May, after entering the alpine region, marked by the more depressed character of the vegetable growth, a farther ascent of a few hundred feet brought us to the crest of the Andes; at the Northern base of the before-mentioned La Vidua Peak. The crest itself proved nearly a league wide, with the surface very uneven; sufficiently elevated for banks of snow to remain here and there in a few spots sheltered from the sun; while hundreds of feet below were lakes, each at the bottom of a pit-like basin devoid of an outlet. We encountered a slight fall of hail and snow, which continued at intervals during the remainder of the afternoon, the quantity insufficient to cover the ground, and melting rather rapidly. Passing the crest, we came upon a streamlet flowing Eastward, one of the thousand sources of the Amazon; following this for "two leagues" along a very gentle declivity, we arrived at dusk at Casa-Cancha. This station for the shelter of travellers consisted of three small buildings, little better than sheds; where too the cold must be endured, fuel proving so scarce as to require economy even in cooking.

The weather was fair on the morning of the 20th; and we separated into two parties, proposing to spend the day in examining the alpine vegetable growth; but after about an hour, snow began to fall fast and thick, and covering the face of the country, put an end to botanizing. We were forced to return, and keep within doors until near nightfall; when the snow, which increased to the depth of an inch or more before melting, finally disappeared.

On the 21st, we left at an early hour, riding over a gently-undulating grassy country; at the end of "two leagues," we turned aside, and visited the silver mine on the Alpamarca mountain; procuring during the ascent many remarkable alpine plants. In the afternoon, we resumed our journey; the path leading over the crest of the Andes at the commencement of a series of majestic snowy peaks, stretching contiguously Northward. The crest proved somewhat narrower than farther South at our first crossing-place, but in like manner contained a lake at the bottom of a deeply-sunk pit-like basin. The elevation seemed much the same, the path leading very near the limit of perpetual snow; and at the base of a precipice, being once

interrupted by ice; so slightly as to have escaped notice, but from being all the *ice* we met with on the Peruvian Andes. From the crest, we descended Westward by the Chancay Valley to Baños, as already mentioned.

After a day at Baños, we reascended on the 23d into the alpine region, and returned to Casa-Cancha; arriving there in time for a short botanical excursion up the neighboring hills.

On the 24th, we turned homewards, following the Canta route. Before reaching the crest of the Andes, I went part way up a detached mountain-peak, conspicuous from the uninterrupted horizontal margin of its cap of snow. On approaching this snow-line, the ground was found to be frozen, and at first seemed devoid of vegetation; after some searching, solitary short blades of grass were discovered here and there, and were extricated with difficulty; higher up, even these had disappeared from the bare spots amid the snow; which last extended everywhere in a thin coating, but compact and hardened. Even at this great elevation, I was unable to obtain an extended view of the Andes; but several grand snowy peaks were in sight, some of them projecting full three thousand feet above the continuous crest. The ground I was standing on had been the bottom of the sea, as was shown by fossil remains of marine animals. Picking up the Ammonite, already mentioned, I returned to the travelled path; joined Mr. Brackenridge, and after descending further to the margin of one of the lakes, we continued on foot across the remainder of the alpine district.

Climate. Some general idea of the climate may be gathered from what has been already stated. Amid perpetually recurring frosts and snows, the dreariness equalling or exceeding that of Terra del Fuego, there is yet no distinction of seasons. Whether rain ever falls, we did not ascertain; but the ground in the daytime was always moist, from the melting of frost and snow. The following Observations of the temperature were taken by ourselves:

May 19th,	on the crest of the Andes;	the lowest temperature during the afternoon,	50° Fahr.
" 20th,	at Casa-Cancha;	at 3 P.M., the environs covered with snow, . .	45° "
" "	"	after nightfall (the snow having disappeared), .	42° "
" 21st,	"	within doors, at sunrise (a heavy frost outside), .	36° "
" 23d,	"	within doors, in the afternoon, ...	44° "
" 24th,	"	within doors, at 6½ A.M., ...	36° "
" "	at the highest point on the crest of the Andes, near the snow limit,		46° "

The vegetable growth is never exposed to severe cold, nor, as in the North, favored with a summer of continuous warmth; but throughout the year, endures oft-repeated almost nightly frosts. That the alpine phase in vegetable growth may exist without "constant humidity," became evident on the Chilian Andes; that it may also exist without the "pressure of accumulated snow," was now manifest.

Character and composition of the vegetable growth. The alpine region, or the portion of the Andes above the elevation of fourteen thousand feet, proved where visited by ourselves more than ten geographical miles wide.

The alpine ground did not appear to be distinguished from the Paramera by the people of the country, as it continues to afford pasturage over the greater part of its area. There is indeed difficulty in drawing a line of demarcation: the alpine habit of growth being assimilated in the Paramera by depressed species of *Baccharis*, and certain other plants; the same genera continuing throughout; and many Paramera species occurring in sheltered situations in the alpine region, as *Ferns* and a *Ribes* in clefts of rocks at Casa-Cancha and Alpamarca. On the other hand, a large proportion of the species, and the genuine alpine phase in growth, appeared to be limited to the uppermost district; where some change in character was also manifest; *Leguminosæ* being comparatively rare, *Saxifrageæ* making their first appearance, *Gentianaceæ* becoming one of the prevailing Tribes, and *Malvaceæ* most unexpectedly abounding.

There were three principal variations in the aspect and local distribution of the vegetable growth:—1. On the Western slope, where we first entered the alpine region, the soil from the steepness being less retentive of moisture, was left partly bare; the scanty vegetable growth occurring principally in detached tufts. There was here very little variety in the genera and species; and the tufts of *grasses* were sometimes a foot high, with their leaves all radical and upright. The same state of things was more or less observable on other steep acclivities.—2. Eastward of the crest, the climate was already sensibly more moist; and the country gently-undulating, was completely covered with a dense sward of short grasses, only an inch high, and often throughout extensive areas uniformly less; the species being mostly distinct from the tufted ones above-mentioned. In certain tracts, were large white bundles of a woolly *Cactus*, that, in the distance, might be mistaken for flocks of sheep reposing. In some slight shal-

low depressions, the sod became wet or marshy; and in such situations, large-flowered *stemless Compositæ* were rather frequent among the grasses.—3. On mountain-peaks, high and broken, *grasses* became scarce, and the blackened soil proved principally bare; the vegetable growth being more congested and more exclusively alpine, and occurring in detached beds. On approaching the snow, the soil was often entirely denuded, destitute of all traces of vegetable growth; yet in exposed spots, many hundreds of feet above the regular snow-limit, we could sometimes on looking upwards distinguish a tinge of green. Of the places we visited, the Alpamarca mountain-peak afforded the greatest variety of congested alpine plants.

I was chiefly interested in the productiveness in genera and species; far exceeding that of alpine ground outside of the Tropics. Many tribes were now for the first time seen in the alpine garb: as *Malvaceæ*, *Valerianaceæ*, *Paronychiaceæ*, *Orchidaceæ*, *Amaranthaceæ*, *Geraniaceæ*, *Astragali* and *Lupines* among Leguminosæ, and species of *Baccharis* besides other Compositæ. The *Ephedra* and *Aldea*, also present, had previously been observed in the alpine garb, on the Chilian Andes.

The presence of *Cactaceæ* in alpine ground was novel; the species moreover being of large size, invested indeed with wool, but neither dwarfed nor presenting the slightest tendency to the congested alpine habit of growth.

The prevailing Tribes of plants appeared to be seven; occurring in the following order of frequency:

1. *Graminaceæ*, or grasses. Already noticed.

2. *Compositæ*. The leading characteristic feature of this alpine region appeared to be the abundance and variety of *stemless Compositæ:* these commenced sparingly in the Paramera, but in the alpine region, their large and often solitary flowers, blue, yellow, white, or purple, were here and there conspicuous throughout the short grassy sward. Beds of depressed species of *Baccharis*, more condensed than in the Paramera, were frequent; composed really of low shrubs, but their flowers and impacted foliage nowhere exceeding the general even surface of the vegetable growth around. There were other *alpine Compositæ*, allied to Fuegian species, and in like manner distinguishable only by the aspect of the congested mass; the solitary flower in each crown of foliage being excessively minute, almost microscopic.

3. *Gentianaceæ*. Next to the stemless Compositæ, the most conspicuous and ornamental plants were *Gentianas;* abnormal however,

with the corolla spreading and more or less rotate, usually blue, but in one exceptional species bright red. An allied genus was further remarkable for the spreading corolla having its numerous segments alternately blue and white.

4. *Caryophyllaceæ.* Consisting principally of inconspicuous-flowered and rigid-leaved *Saginas?* and *Cherlerias?;* growing in alpine tufts or masses, each based on a thick woody subterraneous stem.

5. *Malvaceæ.* Including perhaps as many as three genera: the species mostly blue-flowered, and one of them much resembling the so-called Sida? Pichincensis.

6. *Valerianaceæ.* Some of the species excessively congested.

7. *Umbelliferæ.* Less frequent than in the alpine ground of the Austral Andes, South of the Tropic; and consisting chiefly of congested *Fragrosas.*

In addition to the above seven prevailing Tribes, *Paronychiaceæ* were frequent; including however but a single species, its congested tufts rendered conspicuous by projecting membranaceous stipules.

Of CHILIAN and FUEGIAN ANALOGIES, some were rather striking: as the presence of *congested Umbelliferæ;* of a *congener* of the Fuegian Caltha? appendiculata; and of a *one-flowered Plantago,* with resisting leaves, stellately dividing the alpine turf.

On the other hand, the connection with the alpine ground to the Northward seemed more intimate; and recalling specimens obtained by Jameson on the Andes of Quito, I recognized EQUATORIAL ALPINE ANALOGIES, in the divided-leaved *Saxifraga,* rotate-flowered *Gentianas,* and the blue-flowered *Malvaceous genus* that includes Sida? Pichincensis.

NEGATIVE CHARACTERS. One point of difference from the Equatorial alpine ground was however remarked; the absence of large-flowered Culcitiums.

The rarity of *Lichens* in such a moist alpine district did not seem readily explicable. (*Musci,* or mosses were not noted, and are probably also rare).

Contrary to all expectation, *annual plants* were not altogether wanting; at least, the slight roots of two diminutive species of *Compositæ* would under a different climate be regarded as annual.

The absent tribes of plants continued generally the same as in the Paramera below: but there were further deficiencies, in the disappearance of

Ficoideæ,	Labiatæ,	Bromeliaceæ, and
Boraginaceæ,	Piperaceæ,	Liliaceæ.
Solanaceæ,		

This alpine region is also remarkable for the rarity of *Cyperaceæ* (and especially of the genus Carex); and for the absence of Violaceæ, Ericaceæ, Primulaceæ, and Polygonaceæ.

The following plants were found growing in the alpine region of the Peruvian Andes; above the elevation of fourteen thousand feet:

Nov. gen. (No. 3); Caltha, of authors, and a congener of the Fuegian C. appendiculata. Leaves appendiculate, long-petioled, the apex obtuse, trifid; flowers not seen. In the tract of wet ground near the buildings at Casa-Cancha.*

Cardamine (compare No. 14 lower down, in the Paramera); near C. hirsuta, and apparently the species seen at Culuay. In the environs of Casa-Cancha.

——— (No. 15); perhaps a second species. Dwarf, only an inch high. Intermingled among other plants in the wet depression near the buildings at Casa-Cancha.

Draba (compare No. 4 lower down, in the Paramera at Culuay); oblong, pubescent pods. In the environs of Casa-Cancha.

——— (No. 7); leaves crowded, an eighth of an inch long, obtuse; short, broad pods. Growing at Alpamarca?.

Sisymbrium (athrocarpum of Gray; bis No. 10 lower down, in the Paramera and mountain-region; near No. 6 Mount Rainier ridge in Oregon), and S. canescens. Growing on the crest of the Andes along the Canta route, on the heights above Casa-Cancha, and in other portions of the Alpine region.

Sagina? (No. 5). An inch high; long linear leaves; sepals five. In the environs of Casa-Cancha.

Cherlerioid (compare No. 1 lower down, in the Paramera at Baños). Having the alpine habit of growth; root woody; rigid, pointed leaves; flowers solitary, terminal, short-pedicelled; the five sepals pointed; five? stamens; capsule five-valved. At Casa-Cancha, and elsewhere in the alpine region.

——— (No. 2); similar in habit, densely cespitose. Leaves imbricate, a tenth of an inch long, linear, obtuse; flowers not seen. At Casa-Cancha, and elsewhere in the alpine region.

———; perhaps not distinct from the last. Leaves imbricate, obtuse, hardly a tenth of an inch long; a terminal sessile flower; sepals five. On the Alpamarca heights, or rather mountain-peak.

Cerastium (No. 12). Two to four inches high; puberulous; leaves broad at base, oblong, acute. In the environs of Casa-Cancha.

(Melandrium, bis No. 2 lower down, in the Paramera at Baños); Lychnis of authors, and

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* Urtica (bis No. 27 Baños, at the lower margin of the Paramera); the leaves crowded. In the alpine region, growing only around the buildings at Casa-Cancha, (and therefore in all probability introduced). It had, however, assumed the densely-congested alpine habit of growth.

near L. dioica; pubescent. On the heights above the village of Alpamarca, and elsewhere in the alpine region.

(Malvastrum No. 6; recorded as Gen.) Malvac. Stemless, pubescent; leaves petioled, broad, plicate, dentate; no outer calyx; corolla a fourth of an inch in diameter, white with a bluish base. In the environs of Casa-Cancha.

(——— No. 7). Congested, an inch high by two inches wide, with a stout fusiform root; leaves reniform, a fourth of an inch in length and breadth, crisped and deeply lobed, the lobes about ten, equal; no outer calyx; the carpels about five, villous at the apex. On the Alpamarca mountain-peak.

(——— No. 8); Nov. gen., and a congener of Sida Pichincensis. Leaves tomentose, pinnatisect and dissected; flowers blue. Frequent all over the alpine region.

(——— No. 9); apparently congeneric with the last. Leaves closely pubescent, pinnatisect; the flowers smaller. Frequent throughout the alpine region.

(——— No. 10; recorded as Gen.) Malv. An inch high, nearly stemless; leaves pinnatisect, deeply incised, the segments linear, obtuse, and the under surface white; the flower solitary; no outer calyx; petals linear, upright, scarlet. In the environs of Casa-Cancha, rare.

Geranium (No. 15). Stemless, pubescent; leaves petioled, lobed, the lobes numerous, obtuse; flowers congested. In the environs of Casa-Cancha.

——— ? (No. 16). Smoothish; nearly stemless; leaves deeply divided into about seven equal obtuse lobes; sepals pubescent on the margin; fruit smoothish. In the environs of Casa-Cancha.

Lupinus (bis No. 30 lower down, in the Paramera at Culuay). Stems one to two inches, rigid, recurved; leaflets five to seven; bracts broad; flowers blue; pod half an inch long, hairy. In the environs of Casa-Cancha.

——— (No. 31). Three to four inches high; covered with long soft hairs; leaves long-petioled, the leaflets nine to ten, linear, acute; a dense-flowered raceme, shorter than the leaves. On the Alpamarca mountain-peak.

Astragalus (No. 24); white hairs on the leaves; the leaflets in ten to thirteen pairs. In the environs of Casa-Cancha.

——— (No. 25). Stems shorter than the leaves; the leaflets in about twelve pairs, pubescent, rather large; calyx downy. In the environs of Casa-Cancha.

——— ? (No. 26). Many stems from a thick woody root; smoother, at least the old leaves, the leaflets smaller, and in about ten pairs; pod a fourth of an inch long, inflated. In the environs of Casa-Cancha.

——— (No. 27). Densely congested; leaflets very minute, a twentieth of an inch in length, smoothish, and in about ten pairs; flowers solitary ?, blue. On the Alpamarca mountain-peak.

Gen. Legum. (No. 1). Two inches high; having the habit of Vicia, but the leaves devoid of a terminal tendril, and the pod in a reversed position; stipules semi-sagittate; leaflets in about three pairs, smooth, an eighth of an inch long, lanceolate; flower axillary, short-pedicelled; pod very little longer than the calyx. Among our Casa-Cancha specimens, but the locality not recollected.

Aphanes (bis No. 6 lower down, in the Paramera at Baños). Dwarf; and cespitose. In the environs of Casa-Cancha, and elsewhere in the alpine region. Not catalogued (perhaps no specimens).

Epilobium (No. 23). Having the habit of E. alpinum; leaves elliptical, an eighth of

an inch long, entirish; capsule pedicelled. Procumbent in beds in clefts of rocks, on the heights above Casa-Cancha, and elsewhere in the alpine region.

Myriophyllum (bis lower down, in the Paramera at Culuay; compare Chili, and No. 2 California and Oregon); like M. verticillatum. In a lake deeply sunk in the crest of the Andes, yet probably 14,500 feet above the sea.

Paronychia? (No. 5); a second species. Woody base; leaves linear, an eighth of an inch long, acuminate; large scarious stipules among the flowers; sepals apparently five, inferior; styles two?. Frequent in the alpine region.

Nov. gen. Cactac. (No. 3); a third species. Stems lying in bundles; larger and more woolly than the second species, the fruit and stony seeds also larger. Frequent in the environs of Casa-Cancha; in the distance, resembling flocks of sheep reposing on the green sward.

Ribes (compare No. 17 lower down, in the Paramera). Growing in sheltering clefts of rocks in the alpine region.

Saxifraga Peruviana, Sternb. (No. 11). Pubescent, with the leaves all trifid; but in exposed situations, sometimes stemless with the leaves simple or undivided. Growing on rocks high up on mountain-peaks, above Casa-Cancha, above the village of Alpamarca, and in other localities.

Fragrosa multifida (bis No. 4 lower down, in the Paramera at Culuay). Frequent in the environs of Casa-Cancha, and elsewhere in the alpine region.

———? (No. 6). Cespitose, from underground woody branches; leaves linear, a little broader however in the middle, pointed; usually a solitary terminal floret; capsule a fifteenth of an inch in length, subrotund, sulcate, the commissure broad. In the environs of Casa-Cancha.

———? (No. 7); a second species with entire leaves. The leaves larger, lanceolate, acute at each end, densely tomentose on the upper surface. Growing on the crest of the Andes.

(Oreomyrrhis? No. 2; recorded as) Ferula?. Two to four inches high; leaves multifid; umbels simple, with about ten involucral leaves; mericarps oblong, five-costate. In the environs of Casa-Cancha, and elsewhere in the alpine region.

Galium (bis No. 25 lower down, in the Paramera at Baños); the small species. In the environs of Casa-Cancha.

Valeriana (No. 15); leaves spatulate, lanceolate; scapes entirely naked, two to three inches high. In the environs of Casa-Cancha.

——— (No. 16); perhaps distinct from the last. Leaves linear, obtuse; capit. sessile. Growing on the crest of the Andes.

——— (No. 17). Leaves radical, succulent, attenuate, lanceolate, entire; scap. one to four inches high, with two broad entire leaves; flowers crowded in a globose, or sometimes ovoid capit. On the Alpamarca mountain-peak.

Gen. Valerianac. (No. 1). Succulent, and said to be esculent; root fusiform; leaves an inch in length and breadth, obtuse, surrounding a central cake of flowers, all even at the surface and densely congested. On the Alpamarca mountain-peak.

Gen. Cichorac. (No. 1). Stemless; the leaves lanceolate, somewhat lyrately dentate; a central flower as large as that of Taraxacum, but white, or sometimes pale pink; calyx-scales broad at base, biserial, imbricate. In the environs of Casa-Cancha.

Gen. Cichor.? (No. 1). Stemless; leaves spatulate, lanceolate, entirish; a central very large flower; calyx-scales 3–4-serial. Growing on the crest of the Andes, along the Canta route.

——— (No. 2); compare the preceding. Stemless; the leaves lanceolate, an inch long; a central large flower; calyx cylindrical, the scales 3–4-serial, imbricate, linear, and obtuse. In the environs of Casa-Cancha.

(Chuquiraga; bis No. 3 lower down, in the Paramera); flowers orange-coloured. On the crest of the Andes, the rocky heights above Casa-Cancha, and elsewhere in the alpine region.

(Chætanthera ?, No. 2). Annual; many-stemmed, two to four inches high; leaves lanceolate, sharply dentate towards the apex; calyx-scales 3–4-serial, foliaceous; inconspicuous floret-rays. In the environs of Casa-Cancha.

(Leuceria ?, No. 2); seeming distinct from sp. at Baños. Herbaceous; entirely puberulous; stem three to five inches high, branching from the base; leaves bipinnatisect, multifid, the petiole long and margined; flowers discoidal, very large; calyx-scales all separate, lax, and biserial; pappus pilose. On the crest of the Andes.

Perezia ? (No. 4). Stemless; the leaves pinnatisect, ciliate; calyx-scales ciliate, mucronate. On the crest of the Andes, along the Canta route.

———? (No. 5); perhaps not distinct from the last. Leaves smooth, pinnatifid, Astragalus-like, the lobes rounded, involute, imbricate, ciliate; the flowers not seen. On the Alpamarca mountain-peak, and elsewhere in the alpine region.

——— ? (No. 6). Stemless; leaves two inches long, lyrately dentate; two to three flowers; calyx-scales 2–3-serial, obtuse. On the Alpamarca mountain-peak.

(Trixis ?, No. 2); gen. Senecio-like ?; and a congener of Baños sp. Stemless, smooth; leaves petioled, broad-ovate, two-thirds of an inch by half an inch, crenate, green above, the under surface ferruginous; a central large yellow sessile flower, having long floret-rays; calyx-scales biserial, the outer ones broadest, but of equal length with the interior ones. In the environs of Casa-Cancha.

(——— ?, No. 3); a third species. Leaves all tomentose, white beneath; flower larger. In the environs of Casa-Cancha.

Gen. (Chabræoid ?, No. 1); gen. Senecioid. Multicaul; the stems two to four inches high, covered with crowded leaves or rather divided granules, and thus rendered cylindrical; the flower single, large, terminal, having short white floret-rays; calyx-scales broad, herbaceous, uniserial, obtuse. On the Alpamarca mountain-peak.

Gen. (Trixis-like ?, No. 1); gen Senecioid ?. Stemless, lanately tomentose; leaves broad-ovate, half an inch in length and width, dentate, petioled; calyx-scales spreading. In the environs of Casa-Cancha.

Gen. (Facelid. ?; No. 2); a congener of sp. of Chilian Andes. Annual ?; leaves cartilaginous, imbricate, obtuse, entire, concealed amid long wool; calyx-scales biserial, scarious, acute, about fourteen in the inner row. On the Alpamarca mountain-peak.

——— ? (No. 3); possibly a congener. Exceedingly minute, but aggregated in large congested tufts; leaves smooth, very small, scale-like, roundish, entire, concealed amid long wool, but crowded together, rendering the branches cylindrical and about an eighth of an inch in diameter; flower terminal and single, minute, with apparently about ten uniserial calyx-scales. On the Alpamarca mountain-peak.

Gen. (Labiatiflor. ?; bis No. 1 lower down, in the Paramera at Baños). Growing around Casa-Cancha and Alpamarca.

——— (bis No. 4 lower down, in the Paramera at Baños). Extending into the alpine region; and with the Chuquiraga, reaching a great elevation on the mountain-peaks, nearer the snow than any other large projecting plants.

——— (No. 5); a fifth species. Stemless; cespitose; leaves entirely linear, half an inch in length; no floret-rays. In the environs of Casa-Cancha.

——— (No. 6); a sixth species; near the 5th. Stems one to two inches high; leaves similar to those of the last species, densely crowded; flowers larger, as well the calyx-scales, which are less separated and more acute. On the Alpamarca mountain-peak.

——— (No. 7); a congener of the sixth? Suffruticose, six to nine inches high, closely-tomentose; leaves lanceolate, involute, entirish; no floret-rays. On the Alpamarca mountain-peak.

Gen. (Leucerioid?; No. 3); gen. Senecioid. Culcitium-like, and a congener of Baños sp. ?; twelve to eighteen inches; the whole plant more naked; leaves longer, the upper surface smooth; many flowers. On the Western declivity, a little below the crest of the Andes.

Erigeron? (No 19). An inch high, many-stemmed; leaves pubescent, narrow, spatulate; flower solitary. In the environs of Casa-Cancha.

Baccharis (No. 32). A shrub, but depressed to the general level; leaves an eighth of an inch long, linear, entire, obtuse; flowers solitary, larger than usual. In the environs of Casa-Cancha, and elsewhere in the alpine region.

——— (No. 33). A shrub, but depressed to the general level; leaves punctate, obovate, with three to six dentures; flowers larger than usual, axillary. At Alpamarca, and elsewhere in the alpine region.

——— (No. 34). A shrub, but depressed to the general level; glutinous; leaves cuneate-obovate, with a few dentures; flowers larger than usual. On the crest of the Andes.

——— (No. 35). A shrub, but depressed to the general level; leaves spatulate, obtuse, coarser and thicker than those of (No. 32); pappus long. On the crest of the Andes.

Gnaphalium (No. 58). Seemingly stemless; depressed to the general level, and growing in beds; leaves a fourth of an inch long, obtuse; five to six flowers; the calyx-scales long, pointed, dark-green. In the environs of Casa-Cancha.

———? (No. 59); resembling the last species. Smaller; cespitose, and forming beds; the upper surface of the leaves sometimes green; flowers not seen. In the environs of Casa-Cancha.

——— (No. 60); incano-lanate; leaves and flowers crowded; the calyx-scales silvery. In the environs of Casa-Cancha.

——— (No. 61). Two to three inches high; incano-lanate; flowers crowded, the calyx-scales blackish. In the environs of Casa-Cancha.

——— (No. 62); lanate; the leaves very small, crowded; the flowers also crowded, but rather large; brown calyx-scales. In the environs of Casa-Cancha.

——— (No. 63). Cespitose; stemless, or rather the stem buried to the general surface; leaves nearly destitute of tomentum, obovate, a fourth of an inch in length, recurved, entire; flowers minute, solitary, sessile. On the crest of the Andes.

——— (No. 64). Growing in beds; white-tomentose; leaves broad, a fourth of an inch by an eighth, obtuse; flower solitary, sessile. On the crest of the Andes.

Culcitioid (No. 1). Having the habit of Gnaphalium; leaves incano-tomentose, an inch in length, broad-spatulate; scape or peduncle an inch high, terminating in a single flower three-fourths of an inch in diameter; calyx-scales biserial, spreading. On the Alpamarca mountain-peak.

——— (No. 2); a second species?. Having the habit of a one-flowered Gnaphalium; half an inch to an inch high, growing in beds; lanate; leaves narrow-obovate, obtuse;

calyx-scales biserial, the five or six outer ones long and linear; no floret-rays. In the environs of Casa-Cancha.

——— (No. 3); a third species. Like the first, but more thickly tomentose, the leaves narrower and longer, full two inches in length; the calyx-scales narrower and more numerous. On the Alpamarca mountain-peak.

——— (No. 4); a fourth species. Densely tomentose; stem an inch high; leaves petioled, broad-ovate, acute at each end; flowers large. Growing on the crest of the Andes, where traversed by the Canta route.

——— (No. 5); a fifth species. Having the habit of Culcitium; six to nine inches high; lanate; the leaves upright, lanceolate, with the margin undulate; four to six flowers in a raceme; calyx-scales in at least two series. On the Western declivity, a little below the crest of the Andes.

Gen. Culcitioid, (No. 2). Having the habit of the preceding plant; lanate, and Gnaphalium-like; leaves petioled, broad, the margin undulate; but the calyx-scales about thirteen, and uniserial; scape two inches high; flower half an inch in diameter. On the crest of the Andes, where traversed by the Canta route.

(Werneria? No. 2), gen. near Senecio; a congener of sp. of Chilian Andes. Stemless; the leaves linear, obtuse; calyx monophyllous, with about eight short calyx-teeth; floret-rays whitish. In the tract of wet ground near Casa-Cancha.

(———, No. 3); a second species. Largest; smooth; leaves grass-like and linear, but rigid, pointed, subulate; calyx monophyllous, having about ten calyx-teeth. In the environs of Casa-Cancha.

(———, No. 4); a third species. Herbaceous, stemless, smooth; leaves ciliate, obtuse; a single central flower; about thirteen calyx-scales. On the Alpamarca mountain-peak.

(———, No. 5). Stemless, smooth; leaves succulent, spatulate, lanceolate, obtuse, extending beyond the rays of the large blue flower; calyx naked, monophyllous, terminating in ten or twelve calyx-teeth. In the environs of Casa-Cancha, and elsewhere in the alpine region.

(———, No. 6); a congener?, but no floret-rays. Smooth; stemless, half an inch, growing in beds; leaves narrow-linear, grass-like, or rather subulate and Juncus-like, more or less recurved; flowers discoidal, small; calyx monophyllous at base, naked. In the environs of Casa-Cancha, and on the crest of the Andes.

Gen. (Wernerioid?, No. 1). Stemless, with long hairs on both surfaces of the leaves; the leaves congested, a third of an inch long, narrow-obovate, obtuse, entire; flowers large, more than half an inch in diameter; calyx monophyllous?, or perhaps of uniserial scales. In the environs of Casa-Cancha.

Gen. Senecio-like, (No. 1). Stemless, smooth; leaves petioled, broad, two-thirds of an inch by one-third, lyrately-dentate; flowers rayed, large, and yellow; calyx-scales about twenty-four, uniserial. In the environs of Casa-Cancha.

——— (No. 2). Stemless; leaves lanceolate, obtuse, entire, woolly at base; flowers rayed, yellow?, large; calyx-scales about fifteen, uniserial. In the environs of Casa-Cancha.

——— (No. 3). Stemless; leaves an inch long, linear, with long soft hairs about the base; a single central flower, half an inch in diameter, the floret-rays yellow; about thirteen long calyx-teeth. On the Alpamarca mountain-peak.

Coreopsis odoratissima? (compare No. 5 lower down, at Obrajillo in the mountain-region). Now only four inches high; leaves dissected. In the environs of Casa-Cancha.

Pratia (compare No. 3 lower down, in the Paramera at Baños); leaves narrow obtuse. In the tract of wet ground near Casa-Cancha.

(Halenia) umbellata, (bis No. 2 lower down, in the Paramera at Baños). Extending into the alpine region.

Gentiana (bis No. 14 and 4, lower down in the Paramera at Baños). Extending into the alpine region.

——— (No. 15, and No. 5 with the corolla spreading). Two to three inches; many-stemmed from a woody root; leaves a fourth of an inch, oblong, recurved, crowded; calyx-segments broad, the corolla twice as long as the calyx, spreading. In the environs of Casa-Cancha.

——— (No. 16, and No. 6 with the corolla spreading). Two to three inches, many-stemmed; calyx-segments somewhat acute or pointed; corolla deeply parted, blue, with a central darker spot. In the environs of Casa-Cancha.

——— (No. 17, and No. 7 with the corolla spreading). Three to four inches; leaves sessile, ovate; calyx rather deeply cleft, the segments obtuse; corolla large, two-thirds of an inch, deeply cleft. In the environs of Casa-Cancha.

——— (No. 18, and No. 8 with the corolla spreading). One to two inches high, many-stemmed; leaves linear, obtuse; calyx-segments obtuse; corolla short, only an eighth of an inch, but broad and spreading. In the environs of Casa-Cancha.

——— (No. 19, and No. 9 with the corolla spreading); a sixth species.

———? (No. 20). Leaves half an inch long, spatulate, lanceolate; scape or peduncle an inch high; corolla red, two-thirds of an inch in length, not spreading. In the environs of Casa-Cancha, and elsewhere in the alpine region.

Nov. gen. near Gentiana, (No. 1). Growing in tufts; leaves linear; flowers ornamental; corolla at summit rotate, the tube a third of an inch long, the ten segments alternately blue and white; capsule long-pedicelled, projecting beyond the corolla. In the environs of Casa-Cancha, and elsewhere in the alpine region.

——— (No. 2); a second species. Ornamental; growing in tufts; the leaves broad, short, triquetrous; calyx-segments triquetrous, obtuse; corolla rotate, ten-cleft. On the Alpamarca mountain-peak.

Aldea pinnata, Ruiz & Pav. (bis lower down to the base of the Andes, and No. 2 Chili and the Chilian Andes; compare also No. 1 California and Oregon). Now depressed, having assumed the universal congested alpine habit of growth.

Jovellana (No. 1). Upper surface of the leaves very hairy; scapes three to four inches high; flowers large; calyx-segments broad; the capsule pubescent. In clefts of rocks on the crest of the Andes, where traversed by the Canta route.

——— plantaginea, (No. 2); a second species with denticulate leaves. Growing with the preceding in clefts of rocks.

Bartsia? (bis No. 3 lower down, in the Paramera at Baños); small-flowered. Growing in the environs of Casa-Cancha.

———? (No. 4). Two to three inches high; more closely pubescent; the leaves smaller; the corolla longer than the calyx. In the environs of Casa-Cancha.

(Castilleia, No. 4; recorded as) Euchroma?. Two to three inches high; smoothish; the upper leaves not colored; flowers rather small. In the environs of Casa-Cancha.

(——— No. 5); perhaps distinct from the preceding. An inch high, many-stemmed, smoothish; the upper leaves not colored; flowers small; the capsule large. In the environs of Casa-Cancha.

Plantago (bis No. 39 lower down, in the Paramera at Baños). Sericeous; the leaves linear. In the environs of Casa-Cancha, and elsewhere in the alpine region.

——— (No. 41); near the many-crowned sp. of Terra del Fuego, its resisting leaves in like manner parting the turf into clusters of Actinia-like green stars; not seen in flower. On the heights above the village of Alpamarca.

Philoxerus (No. 2). Half an inch to an inch high; cespitose, and entirely alpine in its congested habit of growth; leaves a third of an inch long, spatulate, crowded, obtuse; flowers in terminal oblong capit. On the crest of the Andes.

Ephedra (bis lower down in the mountain-region, and No. 1 Patagonia, Chili, and the Chilian Andes). In the environs of Casa-Cancha, and elsewhere in the alpine region; depressed, having entirely assumed the congested habit of growth.

Gen. Goodyera-like, (No. 2); perhaps distinct from Obrajillo sp. Leaves half an inch in length, broad-ovate; the flower-stem separate, one to two inches high, with loose and spreading sheaths. In the environs of Casa-Cancha.

Gen. Oreobolus-like, (No. 1). Stemless; leaves a third of an inch long, rigid, pointed; fruct. ovoid, pointed. In congested beds, in wet places, on the crest of the Andes.

——— (No. 2); apparently a second species; agreeing in its congested habit, but larger; leaves an inch long. Found by Mr. Brackenridge.

Luzula (No. 12; compare Terra del Fuego, and No. 11 Paramera). Near L. spicata; the leaves mostly radical, smooth. Frequent in the environs of Casa-Cancha, and elsewhere in the alpine region.

Juncus (bis No. 40 lower down, in the Paramera and mountain-region); like J. bufonius; and four to five inches high. On the Western declivity, a little below the crest of the Andes.

Eleocharis (compare No. 18 lower down, in the mountain-region at Culuay). Four to six inches high. Growing in the environs of Casa-Cancha.

Stipa (No. 22). Cespitose; two to three inches high; the florets small. In the environs of Casa-Cancha.

Agrostis? (No. 37). Half an inch to three inches high; corolla-glumes very small. On the Alpamarca mountain-peak.

Gen. Agrostis-like, (No. 1). Two to three inches high; leaves filiform, curved; panicle coarctate; awn of the corolla not longer than the calyx. In the alpine region.

Gen. Calamagrostoid, (No. 3). One to two inches high; the leaves pubescent; florets awned, and congested in a short spike or panicle; hairs at the base of the corolla. In the environs of Casa-Cancha.

Gen. Agrostoid? (bis No. 1 lower down, at Obrajillo in the mountain-region). Deschampsia-like, and resembling D. cespitosa. In the environs of Casa-Cancha.

——— (No. 2); a second species. Two to three inches high; the florets longer, glaucescent. In the environs of Casa-Cancha.

Poa (No. 26; compare Chilian Andes); near P. annua. Two to three inches high; the spikelets two-flowered. In the environs of Casa-Cancha.

——— (No. 27). Cespitose; two to four inches high; the panicle coarctate; the spikelets small, compressed, two-flowered. In the environs of Casa-Cancha.

Festuca (No. 17; compare Culuay in the mountain-region); like F. bromoides. Two to three inches high, with a spreading panicle. In the environs of Casa-Cancha.

——— (No. 18). Cespitose; the leaves rigid and upright, mostly radical; the panicle coarctate; florets apiculate, the corolla-glumes cartilaginous or coriaceous. Growing

nearest to the perpetual snow, on the mountain-peak East of the crest of the Andes, where traversed by the Canta route.

Bromus (compare No. 11 Obrajillo in the mountain region). Having the habit of Festuca bromoides; six inches high. In the environs of Casa-Cancha.

——— (No. 12). Six to ten inches high; spikelets of about three florets. In the environs of Casa-Cancha.

——— (No. 13). Having the habit of our North American B. pubescens; full two feet high; spikelets pubescent; long awns. In sheltering clefts of rocks, on the heights above Casa-Cancha.

———? (No. 14). Three to six inches high; thick woolly spikelets; short awns. In the environs of Casa-Cancha.

Hordeum (No. 8). Having the habit of Arkansas sp.; three to six inches high. Growing on the crest of the Andes, where traversed by the Canta route.

Gen. Cryptogam.? (No. 1). Having the habit of certain mosses, and growing in large rounded masses; minute crowded foliaceous scales, spirally disposed, the stems like twisted cords. On the rocky heights, above the village of Alpamarca.

Filices, (bis lower down, in the Paramera and mountain-region). Some of the Paramera species extending into the alpine region, and growing in clefts of rocks on the heights above the village of Alpamarca.

Lichenes. Extremely rare, for a moist alpine district.

6. The Mountain-region on the Eastern slope of the Peruvian Andes.

The Eastern Division of the Paramera was not visited: but its border could not have been far from Casa-Cancha; where there were no indications of change in the vegetable growth. The country beyond was described as "pampas" or pasture-land for some sixty leagues Eastward, to the "montaños" or wooded country; the crest of the Andes being estimated at one-third of the distance between the coast and the "montaños."

According to Mr. Matthews, on first descending Eastward, "we lose the Calceolarias, and their place is supplied by *Ericaceæ* now making their appearance, the *Ceratostemmas* and *Macleanias*;" to which may be joined other low woody plants, some *Proteaceæ*, *Escallonieæ*, and *Ternstroemiaceæ*.

Mr. Wilcox, residing on the crest of the Andes farther South, informed me, that his "hacienda was at the elevation of fourteen thousand and some hundred feet, and higher than Casa-Cancha:" our interview, on the 7th of June, being "harvest-time in his neighborhood, at Tarma and Xauja," the nearest cultivated districts on the Eastern side of the Andes.

The *Cinchonas* and abundant *epidendric Orchidaceæ*, mentioned and described in the Flora Peruviana, probably occur yet lower down; perhaps, in an additional mountain-region.

7. The Interior Forest-region of Equatorial America.

The "montaños" were described as fairly down at the base of the Andes; being, in fact, the commencement of the profuse rains and great Equatorial forest. From the Flora Peruviana, we learn, that the *Bertholletia* makes its appearance in this moist and warm climate; together with *Heliconias*, *Araceæ*, many singular *Palms*, and the tribes of plants generally that we are accustomed to associate with Tropical America: the species, however, notwithstanding that the forest is continuous, seem universally distinct from those growing on the Lower Amazon, and along the Atlantic coast.

It thus appears, that in proceeding inland three hundred miles from the Pacific, we traverse at least six botanical regions; so distinct in climate, that the plants growing generally in any one of these regions will not flourish in either of the remaining five.

On the 24th of May, after leaving the alpine region, our party continued down the Paramera by the Canta Valley; and stopped for the night at the first house, situated about a league above Culuay.

On the 25th, we continued leisurely down the Canta Valley, collecting on our way; leaving the Paramera, and towards evening arriving at Obrajillo, where we stopped for the night.

On the 26th, we continued down the Valley, collecting by the way; leaving the mountain-region, and towards sunset stopping for the night at Yaso.

On the 27th, we set out at 7 A.M., continuing down the Valley; passing Yanga at 2 P.M., we proceeded to a house a short distance below, and stopped there for the night.

On the 28th, we crossed the mountain-ridge to Caballeros; and continued on until late in the evening, when we entered the city of Lima.

On the 20th of June, news came of the arrival of the Vincennes. The vessels of the squadron, the missing schooner Sea-gull excepted, were now all at anchor before Callao.

On the 28th, in company with Lieutenants Knox and Underwood, I sailed in the Flying-fish Southward along the coast; after proceeding "about twenty miles," the schooner was anchored at midnight, opposite to the ruins of PACHICAMAC, and as near as practicable to the shore.—On the morning of the 29th, Lieut. Underwood landed with balsas through the surf; it was soon perceived, that the rollers, although so heavy, were distant and regular, and watching an opportunity, Captain Pinckney succeeded in conducting a boat safely to the beach. We met persons who stated, that "no one had ever before landed there." Stepping over the inconsiderable stream that descends through the Lurin Valley, we proceeded to the Pachicamac hill, and spent some hours in examining the ruins of the aboriginal town and temple. Towards sunset, we returned to the boat; which was launched, and after being backed rapidly before two or three rollers until they had broken, arrived safely at the vessel's side. We escaped without accident; but cannot recommend visiting Pachicamac by sea.—At daylight on the 30th, the schooner again entered the harbor at Callao.

Towards evening on the 13th of July, leaving the Relief at Callao, the Vincennes and remaining vessels of the squadron sailed Westward, directly away from the land.

On the 14th, the weather was calm; and two of the Antarctic birds, Procellaria Capensis, wandering along this coast even within the Tropics, showed that the climate continued cool.

On the 15th, the wind was light, and the sky most of the time obscured, but the sun occasionally became visible. We were now getting beyond the influence of the land, and even of the cold oceanic current from the South; flying-fish, Exocetus, being seen on the 18th, which proved our first fine and clear day.

CHAPTER VII.

AFRO-INDIAN REGIONS. FIRST DIVISION: THE ISLAND REGIONS, POLYNESIAN AND EAST INDIAN.

On the morning of the 30th, the wind was Southwest, but with this slight exception, continued fair; and our course being West slightly inclining Southward, thirty-one days' sail, brought us across the intervening tract of ocean between the American coast and the coral-producing portion of the Pacific.

a. The Paumotu Archipelago of Low Coral-Islands.

On the 13th of August, we were preparing for new scenes, having entered a portion of the ocean avoided by navigators, and termed the "Low" or "Dangerous Archipelago;" comprising the whole space between three distant rocky and volcanic groups of islands, the Gambier, Taheitian, and Marquesas Groups.

1. Clermont-Tonnerre Coral-island. At length, "land" was announced; and late in the afternoon became visible from the deck. It was however unlike land, and seemed rather a fleet of vessels anchored in mid ocean; tree-tops rising into view for a moment, and then sinking out of sight, from the alternating swell of the ocean. As we sailed on, the tree-tops seemed to acquire stability, and were tinged with green; at their base, the pale clay-colored coral-strand next became visible; and soon afterwards, the snow-white surf. In the mean time, the discovery was made from aloft, that there was only a narrow rim of land encircling an expanse of ocean.

This coral island was found to be "ten miles long by one and a half

wide;" its Southeastern extreme being "in S. Lat. 18° 33′ and W. Long. 136° 21′." The rim of land appeared to be throughout about eighteen feet high, or three times the height of some natives standing among the shrubs; but a survey-party, in circumnavigating, discovered a place where the land "was very low, as though the surf broke over occasionally into the lagoon."

Aware that we had reached the border of a new creation, I was impatient to look upon growing East Indian plants; and on the 14th, towards noon, I obtained the opportunity of landing.

The surf broke against a low bank, which proved a horizontal shelf of dead coral, extending back about a hundred feet, and containing shallow pools of clear water left by the tidal overflow. Two or three boulder-like blocks of coral-rock, of several tons weight, were resting on this shelf; while smaller fragments were strewed here and there, some of them rounded by attrition in the surf; or in a few instances, united by secondary adhesion into coral-rock conglomerate.

Beyond the coral-shelf was a regular alluvial strand, rising gradually to the top of the island; which was found to consist principally of angular fragments of coral-rock, in no respect rounded by the rains; owing doubtless, as I had formerly observed in calcareous pebbles of river-beds, to the great solubility of the material. The land proved in fact only a beach, extending around in a ring; and the sandy inner slope being more gentle, the distance across, from the surf to the "lagoon" or lake of sea-water, seemed about five hundred feet.

For a long distance towards the centre of the lagoon, the water was extremely shallow, as was ascertained by wading; the bottom being an even floor of coral-rock, much resembling some limestone strata, and in like manner containing quantities of imbedded shells; but on closer examination, the imbedded species proved identical with living ones around. Specimens of the ponderous Tridacna squamosa were abundantly imbedded in their natural position; while living specimens, attached to the coral floor by the ligamentous byssus, seemed waiting their turn; except, that the floor being of dead coral was not susceptible of further increase. The water of the lagoon was as transparent as in mid-ocean; the margin only, being rendered turbid and milky white by the clayey decomposition of coral and shells. There was no mineral basis; the whole island, rock, pebbles, gravel, sand, and fine earth, consisting exclusively of the debris of organic life, of successive generations of corals and shells.

The vegetable growth was confined to the top of the island; where the freshly-green foliage showed, that we were again in districts subject to rain. The most prominent plant proved to be *Tournefortia argentea*, a large-leaved Cestrum-like shrub, eight or ten feet high, with coarse spreading branches; the intervening beds of *Scævola Kœnigii*, a procumbent straggling shrub a foot high, being in some places dense enough to conceal the soil; *Suriana maritima* was also a frequent shrub, four to six feet high, and growing singly; while on all dead branches, a small but pretty *Lichen* (Borrera?) was abundant. Here and there, *Cassyta filiformis* was variously entwined, somewhat after the manner of Cuscuta, but the stems larger, very much longer, and of a green color. A single tree, twenty feet high, with spreading branches and light-green leaves (perhaps the *Calpidia*), was growing in the distance; and more conspicuous than all the rest, the scattered stocks of *Pandanus*, at one end of the island forming a grove, were strikingly un-American in aspect.

In the intervals between the shrubs, and often where these were absent, humble plants more or less herbaceous were here and there scattered over the bare soil, for the most part growing singly: as a trailing *Boerhaavia* with small purple flowers; a *Lepidium* with smooth, succulent, and apparently perennial leaves; an upright large-flowered *Meridiana?*; an *Achyranthes* about two feet high; a tenderly-herbaceous *Urtica?*, only three or four inches high; the yet more humble *Heliotropium? anomalum*; and tufts of a single grass, a low and branching *Lepturus*.

The following plants were found growing on Clermont-Tonnerre: and it will be observed, that our geographical order of numbering commences with this island:

Lepidium (No. 1). A foot high; stem suffruticose at base; leaves smooth, succulent, evergreen? Frequent.*

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* Cocos nucifera, (bis No. 1 Tropical America). About a dozen cocoa-palms were here and there projecting amid the Pandanus grove, none of them much exceeding thirty feet in height; specimens of the old fruit were also met with. So well is it understood, that the cocoa-palm occurs only in the cultivated state throughout the islands of the Pacific, that traders, according to Capt. Vanderford, follow the rule, "Wherever you see a cocoa-palm, you will find natives."

Pandanus (No. 1; a Polynesian and submaritime species). A few stocks growing where we landed, some of them in fruit; (to all appearance spontaneously disseminated, but the plant being useful to the natives, had possibly been introduced by them).

Suriana (No. 1). A shrub, four to six feet high; very soft pubescence; four or five distinct carpels. Abundant.

(Meridiana? lutea; No. 1); Portulaca, Forst. Obs. 443. Full of branches, upright, four to eight inches high; leaves opposite, short-petioled, very thick, succulent; two sepals; flowers one-third of an inch in diameter, terminal, solitary or sometimes in pairs; petals four; stamens numerous; six or more stigmas.

Scævola (Koenigii; No. 1). A shrub; the ripe berry white. Very abundant.

Tournefortia (argentea; No. 1). A shrub, eight or ten feet high; berries single.

(Pentacarya anomala; No. 1); Myosotis-like. Only one to two inches high; leaves crowded, linear, and obtuse; some indications of flowers, disposed apparently in a peduncled cyme.

(Calpidia?, No. 1). A single distant tree, twenty feet high; the leaves, as seen through the glass, appeared to be oblong and penninerved?

Boerhaavia (No. 1). Herbaceous, one to two feet long; leaves broad and obtuse; corolla one-eighth of an inch, purple.

Cassyta (No. 1); calyx-persistent, with three large outer segments and three small inner ones; the fruit a berry. One specimen at least having leaves, which are linear-obtuse and much resemble those of Suriana. (Both Mr. Brackenridge and myself remain under the impression, that we found leaves on the Cassyta at Clermont-Tonnerre; we often searched for them afterwards throughout the islands of the Pacific and the East Indies, but invariably without success; my own impression is, that the leaves were opposite; but as the specimen cannot be found, I can only commend the subject to future observers).

Achyranthes (No. 1). Two feet high; woolly, with pink florets.

Urtica? (No. 1). Only three or four inches high; suffruticose at base; leaves smooth, tenderly-herbaceous, ovate and crenate. Rare.

(Lepturus?, No. 1). Gram.; six to nine inches high, branching; not in flower. Growing in tufts.

Borrera? (No. 1); a small species. Frequent on the dead branches of shrubs.

Parmelia? (No. 1). Diminutive, closely appressed in interstices left by the preceding lichen on dead branches; the fructification not seen.

2. SERLE CORAL-ISLAND. During the evening of the 15th, the Vincennes left Clermont-Tonnerre, sailing West by North; and at 10 A.M. on the 16th, we again saw tree-tops rising into view at intervals, from the alternating swell of the ocean; in short, a repetition of the above-described approach to a low coral-island; scenes with which we were destined to become familiar.

Serle coral-island proved to be "about thirty-two miles from Clermont Tonnerre;" from which it may be distinguished by a conspicuous cluster of trees at the Southeast, and another at the Northwest end, and by some of the islets in the lagoon being crowned with vegetable growth. We did not land; our plans being disconcerted by an accident which caused delay. Lieut. Alden approaching the shore in

a boat, had an interview with several natives, and procured from them various articles, including some of the vegetable productions:

(Calpidia?; compare No. 1 Clermont-Tonnerre coral-island). A cluster of tall trees at the Southeast end of the island, some of them sixty feet high, and remarkable for their few and upright, or upward-tending branches.*

Cassyta; bis (No. 1 Clermont-Tonnerre coral-island). A bundle of the twining stems "worn by one of the natives," was among the articles brought off by Lieut. Alden.

(Procris?, No. 1). Twisted cords, made of some kind of fibrous bark, were procured from the natives. The dense clump of trees with dark-green foliage at the Northwest end of the island (seemed also distinct from anything on Clermont-Tonnerre).

3. Henuaki, or Honden coral-island. Our course was now changed, and the Vincennes sailed Northward until the 19th, when we arrived in sight of Honden coral-island; situated in about "S. lat. 14° 56′ and W. Long. 138° 48′;" and from the immense numbers of sea-birds and the absence of cocoa-palms, clearly uninhabited by man. The island proved much smaller than the two already visited, and from the ship seemed almost entirely occupied by a dense grove of *Pandanus;* in reality, concealing a central lagoon. Landing with others, Capt. Vanderford proceeded "full half a mile inland" to the lagoon; which he found "nearly a mile in diameter, and almost circular in shape, with an irregular canal leading outwards, so that a high tide would flow over and communicate."

I landed for a few moments only, and on a different part of the island; and found the grove almost forest-like, composed of the *Pandanus* growing in all its native grace, with here and there a *Calpidia* tree fifty feet high. The *Scævola* abounding in the more open places, and constituting the beds of low green bushes that extend from the grove outwards, and are conspicuous in the distance. Neither the Suriana nor the Cassyta were met with: while, so far as I was able

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*Cocos nucifera; bis (Clermont-Tonnerre coral-island, and No. 1 Tropical America). Some scattered cocoa-palms growing at the Northwest end of the island; taller than on Clermont-Tonnerre.

(Colocasia macrorhiza?; No. 1). The "large leaf worn by one of the natives around the neck and over the breast," belonged perhaps to C. macrorhiza; which was afterwards found cultivated on coral-islands).

Pandanus; bis (No. 1 Clermont-Tonnerre coral-island). Frequent throughout, as examined with the glass from the ship's deck, and seemed to be the prevailing plant.

to examine the growing plants, only one additional species made its appearance; as will be perceived by the following List:

Lepidium; bis (No. 1 Clermont-Tonnerre coral-island).

(Meridiana?, bis No. 1 Clermont-Tonnerre coral-island); the flowers full half an inch in diameter. (Unlike Portulaca, specimens of the plant fall to pieces in drying).

Scævola; bis (No. 1 Clermont-Tonnerre coral-island). Very abundant.

Tournefortia; bis (No. 1 Clermont-Tonnerre coral-island). Here arborescent, forming a small tree, fifteen to twenty feet high; (the leaves in drying become strigosely-sericeous and Lithospermum-like).

(Calpidia ovatifolia?; compare No. 1 Clermont-Tonnerre and Serle coral islands; Pisonia-like). A tree fifty feet high; leaves sub-opposite, ovate, acute at each end, sub-serrulate; flowers not seen.

Boerhaavia; bis (No. 1 Clermont-Tonnerre coral-island).

Achyranthes; bis (No. 1 Clermont-Tonnerre coral-island). Frequent.

Urtica (No. 2); a second species. A foot or more high; very tenderly herbaceous; leaves long-petioled.

Pandanus; bis (No. 1 Clermont-Tonnerre and Serle coral-islands. We obtained evidence that the island had been sometimes visited by natives; it is possible therefore, that the Pandanus has been introduced, and is not spontaneously disseminated).

(Lepturus); bis (No. 1 Clermont-Tonnerre coral-island), the undetermined grass; again, not in flower.

4. Waitoho and Otua, the two Disappointment coral-islands. The Vincennes next pursued a Western course, and on the 23d arrived in sight of Waitoho, the main Disappointment Island; having its North-west end in about "S. Lat. 14° 10′ and W. Long. 141° 18′." In coasting along the shore in a boat, Waitoho was found to be little else than a lagoon; much of the rim of land-surface being a wash, and the succession of three or four dry banks hardly anywhere exceeding twelve feet in height. The *Pandanus* seemed the most conspicuous and abundant plant; we were not near enough to distinguish anything further in regard to the species of shrubs and other plants composing the vegetable growth.

Otua, "twelve miles distant," was found to be a mere strip of coral-beach, "three or four miles long, a few hundred feet across," and twelve to sixteen feet high throughout. Landing with others on the 26th, Mr. Brackenridge and myself succeeded in reaching the top of the beach; but after a few moments, our examination of the vegetable growth was interrupted by the natives. The Suriana and Cassyta continued absent: on the other hand, among the growing plants, one additional species here made its appearance; as will be perceived by the following List:

(Lepidium; bis No. 1 Clermont-Tonnerre and Henuaki coral-islands. Observed on Otua).*

(Meridiana? lutea); bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands); Portulaca of Forster. "Observed on Otua" by Mr. Brackenridge.

Scævola; bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands). Abounding on Otua.

Tournefortia; bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands). Growing on Otua.

(Calpidia ovatifolia?); bis (No. 1) Henuaki coral-island; Pisonia-like. A tree, forty to fifty feet high; not in flower. Growing on Otua; and probably observed in the distance on Waitoho, the trees there being equally lofty, but having upright branches as on Serle coral-island.

Boerhaavia; bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands). Growing on Otua.

Achyranthes; bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands). "Observed on Otua" by Mr. Brackenridge.

Procris? (compare No. 1 Serle coral-island). Mr. Brackenridge thinks he met with this, but is not confident. (At all events, remnants of "tapa" or bark-cloth were obtained from the natives of Waitoho, and may have been manufactured from this plant).

(Lepturus); bis (No. 1 Clermont-Tonnerre and Henuaki coral-islands). Growing on Otua.

Polypodium (No. 1); a creeping rhizoma; fronds two feet or more. Frequent on Otua.

5. Taiara, or King's coral-island. Leaving Otua, the Vincennes returned Southward, and on the 29th arrived in sight of Taiara; a coral-island having its centre in about "S. Lat. 15° 42′ and W. Long. 144° 39′," and seeming about twelve feet high throughout; there being no signs of an outlet to the lagoon. On approaching in boats, the coral-shelf was found overflowed by the tide, so as to intercept and neutralize the surf, and we experienced no difficulty in reaching the shore. The rim of land-surface between the sea and the lagoon was ascertained to be "twelve hundred feet" across; and the water in the lagoon, which from the ship seemed entirely blue, proved slightly turbid and whitish close along the shore, from decomposed coral, as at Clermont-Tonnerre.

The vegetable growth proved somewhat more varied than on the coral-islands thus far visited, no less than ten additional species making their appearance; as will be perceived by the following List:

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* Cocos nucifera, (bis Clermont-Tonnerre and Serle coral-islands); the cocoa-palm. Somewhat more frequent on Waitoho than on the coral-islands thus far visited; yet the natives were unwilling to part with any of the fruit. Entirely absent from Otua.

Pandanus; bis (No. 1 Clermont-Tonnerre to Henuaki coral-island). Very abundant on Waitoho, where it seemed the prevailing plant.

Lepidium; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands). From one to three feet high.*

Suriana; bis (No. 1 Clermont-Tonnerre coral-island).

(Meridiana? lutea); bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands); Portulaca of Forster. "Observed" by Mr. Brackenridge.

(Pemphis acidula; No. 1); gen. Lythrac. A shrub, three to twenty-five feet high, having the habit of Leptospermum and Myrtaceæ; leaves minutely and closely pubescent; calyx 5–6-cleft, persistent, but the capsule really superior; stamens of equal length with the petals.

(Erithalis polygama, Forst.; No. 1; Timonius, Dec.); gen. Coffeac. A shrub, four to six feet high; leaves broad-elliptic; corolla tubular, elongate, 5-fid; berry black, containing several small seeds. Abundant.

(Petesia carnosa; No. 1); gen. Rubiac.. A shrub, twelve to eighteen inches high; leaves attenuate, oblong; tube of the corolla short; berry inferior, white with a purple tinge.

(Guettarda speciosa; No. 1); Gardenioid?. A tree, twenty to thirty feet high; leaves large and broad, notched or having a slight sinus at base, sometimes slightly pubescent; corolla tubular, 6–8-fid; fruit inferior, large. Frequent.

Scævola; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands).

Tournefortia; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands). "Observed" by Mr. Brackenridge.

(Pentacarya anomala); bis (No. 1) Clermont-Tonnerre coral-island; (Heliotropium of Hooker), but having five carpels.

Gen. Myoporac. (euphrasioides; No. 1; Myoporum of Hooker). Twelve to eighteen inches high, and having the habit of Cunila; leaves opposite, entire; calyx equal; corolla bilabiate; a hard two-celled capsule, each cell containing a single seed.

Boerhaavia; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands).

Achyranthes; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands).

Cassyta; bis (No. 1 Clermont-Tonnerre and Serle coral-islands); calyx persistent, becoming fleshy, and finally white; carpel free, not adherent to the calyx, containing a single seed.

Euphorbia (ramosissima, Hook.; No. 1). Suffruticose, three to four feet high, branching; leaves opposite, roundish-elliptic, their under surface white; flowers corymbose. Frequent.

Urtica; bis (No. 2) Henuaki coral-island, and perhaps not distinct from No. 1 Clermont-Tonnerre.

(Procris?, compare No. 1 Serle and the Disappointment coral-islands). A small tree with dense dark-green foliage, seen from the ship on a part of the island not visited.

Lepturus?; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands).

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* Cocos nucifera, (bis Clermont-Tonnerre to the Disappointment coral-islands). The cocoa-palms had been all planted; and strings of the nuts ready for transportation, showed that the island had been recently visited by natives.

Morinda (citrifolia; No. 1). A shrub, six to ten feet high; leaves penninerved, acute at each end. Rare; (the plant, bearing esculent fruit and being otherwise useful to the natives, may in some instances have been introduced into the coral-islands).

Pandanus; bis (No. 1 Clermont-Tonnerre to the Disappointment coral-islands). Twenty to twenty-five feet high.

(Digitaria, No. 1); near Milium paspalodes. Twelve to eighteen inches high; having digitate spikes.

(Psilotum, No. 1); Bernhardia of some writers. Somewhat rare.

Polypodium; bis (No. 1 Disappointment coral-islands). "Sometimes about the roots of trees," Brackenridge.

Asplenium (No. 1); near A. nidus; fronds clustered, sometimes measuring four feet. In the thickest and most shady portion of the forest-growth; rare.

Ramalina? (No. 1). On the dead branches of trees and shrubs.

6. RARAKA CORAL-ISLAND. Continuing on, the Vincennes on the morning of the 30th, arrived in sight of Raraka. This is one of the largest of the coral-islands, seeming "twenty miles by fifteen;" but with the increase in outline, the rim of land-surface remained of the usual width. The outlet of the extensive lagoon was found in "S. Lat. 16° 06′ and W. Long. 144° 58′," having sufficient depth of water to admit a schooner; but the channel was narrow and crooked, with a current always flowing outwards, and there was besides a strong head wind. Two large sea-going double-canoes that had been taken through, were drawn up on the beach inside; the Western Paumotuans being accustomed to pass from island to island, and appreciating the advantages of social intercourse. We met with a friendly reception, and spent parts of two days on shore.

The Polypodium and the two grasses being excepted, the remaining species of plants observed on Taiara were all found growing on Raraka: the following were especially noted; and it will be perceived, that there is only one additional species, here making its first appearance:

Procris?; bis, (compare No. 1 Serle and the Disappointment coral-islands). Only eight feet high, not exceeding the dimensions of a shrub. Rare; (the plant being used by the natives for making "tapa" or bark-cloth, has possibly been introduced into the coral-islands).*

(Digitaria); possibly a second species (and distinct from No. 1 Taiara coral-island); the florets in digitate spikes, but seemed smaller, and somewhat pubescent.

Ramalina? (compare No. 1 Taiara coral-island). On the branches of shrubs.

Boletus (No. 1); cartilaginous, or almost woody. Found by Mr. Brackenridge.

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* Cocos nucifera, (bis Clermont-Tonnerre to Taiara coral-island). We fell in with a regular plantation of an acre or more of young cocoa-palms; and observed generally in our rambles, that wherever a cocoa-palm happened to be springing up, stones had been placed around for its protection.

7. KAWAKI CORAL-ISLAND. In plain sight from Raraka, at the distance of "ten or twelve miles," another narrow fence-like rim of land commenced encircling a wide expanse of ocean; this proved to be the coral-island of Kawaki, measuring "sixteen miles by ten."

On the 2d of September, Mr. Brackenridge landed with others on Kawaki; but found there "only plants already seen by us on other coral-islands," as the

(Procris ?) or "Morus?" (compare No. 1 Raraka coral-island, &c.).*
Gen. "Rubiac. berried," (compare Taiara coral-island).
(Pemphis) or Gen. "Lythr." (compare No. 1 Taiara coral-island).

8. ARATIKA, or Carlshoff coral-island. Sailing thence about "twenty miles," the Vincennes towards evening arrived in sight of Aratika; having its Western extreme in "S. Lat. 15° 26′ and W. Long. 145° 40′." This coral-island measured "eight miles long by five wide;" and at one time, was nearly all included within the range of vision from the mast-head. In sailing along, the rim of the island was observed to be chiefly a wash, with a succession of dry banks, none of them sufficiently elevated to be crowned with vegetable growth. North of this low portion, a clump or dense grove of trees commences, and extends uninterruptedly more than a mile, or as far as the ship proceeded.

On the 3d, Mr. Brackenridge and myself landed in front of the Watering-place; and entering the woods a fourth of a mile, were surprised to find a large and deep pool of fresh-water, fifty or sixty feet in diameter. The grove was more forest-like than any we had previously seen on coral-islands; the ground being covered throughout with a layer of dead leaves. The principal tree was the *Calpidia*, forty feet high, with the trunk three feet in diameter, often crooked and irregular, branching nearly from the base, and presenting besides some anomalies of growth; the branches being sometimes compressed, after the manner of the exposed portions of the roots, or turning downwards and entering the ground, giving rise to upright secondary trees. The *Psilotum* was abundantly attached to the trunks; and the *Polypodium* rambling over them in luxuriance, as

* Cocos nucifera, (bis Clermont-Tonnerre to Raraka coral-island). Two or three cocoa-palms were the only signs of inhabitants met with, even by the party that landed: the "people" known to the natives of Raraka, living doubtless on a distant part of the island.

also on the ground; the proper undergrowth consisting of the *Morinda* and other shrubs, with the *Achyranthes*. The *Pandanus* was also abundantly intermingled; and towards the South, the *Calpidia* by degrees gave place to the *Procris* or "mulberry," the grove continuing of equal height.

The Lepidium, Boerhaavia, Urtica, and the Grasses being excepted, the remaining species of plants observed on Taiara coral-island were all found growing on Aratika. On the other hand, but two additional species here made their first appearance; the following List, as will be perceived, being incomplete:

(Calpidia ovatifolia?; bis No. 1 Henuaki and the Disappointment coral-islands). A tree, presenting anomalies in growth described above; leaves opposite, penninerved, the margin as though minutely serrulate; the flowers and fruit here first met with; the flowers mono-chlamid or having but one floral envelope, which is small, greenish, and 5-cleft; stamens as many as eight or ten; fruit inferior?, resembling that of Pisonia and Plumbago.*

Achyranthes; bis (No. 1 Clermont-Tonnerre to Taiara coral-island).

Procris?; bis (No. 1 Raraka coral-island, &c.); the "mulberry." At Raraka seen only as a shrub, but here a tree, forty feet high. The natives, "twenty" in number, were provided with an iron hatchet, by means of which they had felled several of these trees, and had besides excavated two canoes; intended, with the timber, "for the Taheitian market."

(Psilotum); bis (No. 1 Taiara coral-island).

Polypodium; bis (No. 1 Disappointment and Taiara coral-islands).

Musc. incert. (No. 1). A moss was rather frequent on the bark of old trunks; the first of the tribe we had met with on coral-islands.

Lichen incert. (No. 1). Incrusting old bark; in company with the preceding moss.

9. MANHII CORAL-ISLAND. Sailing thence, the Vincennes, on the 4th, arrived in sight of Manhii; having its Eastern end in about "S. Lat. 14° 26′ and W. Long. 146° 04′." This is a large coral-island, "full fifteen miles in length and breadth," with an entrance to the lagoon; visited by Captain Vanderford, and regarded by him as of sufficient depth to "admit a ship of war;" the "natives also mentioned the name of a ship that had passed through into the lagoon."

On the 6th, our party landed; separating in different directions. In

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* Morinda; (bis No. 1 Taiara coral-island. Having every appearance of being spontaneously disseminated).

Pandanus; bis (No. 1 Clermont-Tonnerre to Taiara coral-island. To all appearance, spontaneously disseminated).

walking along the coral shelf, I observed cracks in it, continuous for hundreds of feet, and only a little more irregular than the ice-cracks of a frozen lake; equally devoid of displacement of level, or geological fault. Along the outer margin, were natural bridges, also holes in the coral-shelf thirty or forty feet from the sea, but freely communicating beneath; and it occurred to me, that in such situations, a heavy storm-wave might sometimes burst up portions of the coral-shelf, throwing over fragments tons in weight, such as are often seen on coral-islands.*

The vegetable growth, as far as examined by myself, proved entirely the same as on Taiara coral-island; but with less variety, nearly one-half of the species being absent. An additional species was however discovered by Mr. Brackenridge:

Gen. Scirpoid (No. 1). Cespitose, three to four inches high; somewhat Dichroma-like, except that the floral leaves are small and short, not enlarged, nor exceeding the terminal cluster of spikelets. Found by Mr. Brackenridge.

10. Ahii coral-island. In plain sight from Manhii, but much smaller; seeming only "five or six miles in length and breadth," with the lagoon destitute of an outlet.

On the 7th, I landed with others, and remained several hours on shore. The rim of land-surface measured "2860 feet" across, or more than half a mile; and being wider than usual, the woods in some spots were slightly forest-like; the *Achyranthes* again constituting the prevalent undergrowth, but here very luxuriant, suffruticose or shrubby, and four to six feet high.

* In further illustration of this subject, the following Newspaper extracts may be compared:

"A block of granite on Boon Island, about fourteen feet in extreme length, ten feet wide, and from five to six feet in height, was lifted from its bed in the ledge, and carried up an inclined plane of from twelve to fifteen degrees, to a distance of near sixty feet. This occurred during a N. E. snow-storm, in the year 1852, and shows the power of wind and waves."—(Portland Argus.)

"Near Plymouth, England, during a heavy gale, a block of limestone, weighing seven tons, was driven up by the waves to the distance of one hundred and fifty feet; and blocks of from two to three tons' weight were washed about like pebbles.—It has been found, by experiments made on the coast of Scotland, that the waves from the Atlantic fall with twice the force of those from the North Sea. An Atlantic breaker will frequently fall with a force of three tons to the square foot, or twenty-seven tons to the square yard."—(Reprint from an English Newspaper.)

The Lepidium, Morinda, Digitaria, and Psilotum were absent: the remaining species of plants observed on Taiara coral-island were all found growing on Ahii; and notwithstanding a careful search, we were unable to discover a single additional species:

Achyranthes; bis (No. 1 Clermont-Tonnerre to Aratika coral-island).*
Procris?; bis (No. 1 Raraka and Aratika coral-islands).

11. Rairoa, or Dean's coral-island. On the 8th, the daytime was chiefly spent in sailing along Rairoa; the largest of the coral-islands, and according to our measurement "sixty-six miles in length;" for the greater part of this distance, presenting the novel spectacle of two narrow ruler-like parallel bands of land stretching along interminably. The only variation being, that in a few places the rim of land was so low as to be a wash, or perhaps altogether overflowed. The Western extreme was found to be in about "S. Lat. 15° 05′ and W. Long. 147° 59′."

The rim of land-surface was narrow throughout, and the vegetable growth seemed scanty and uninteresting. As examined with a glass from the ship's deck, I could discover no plant of a different aspect from those we had already met with on coral-islands.†

12. Tikehau, or Krusenstern coral-island. Towards sunset, the Vincennes passed the Western end of Rairoa and came in sight of Tikehau; another large coral-island, nearly "thirteen miles" distant. Night came on before we could get near Tikehau; and the ship turning Southward, we took leave of the Paumotu archipelago of low coral-islands.

b. Bellinghausen Coral-Island.

To complete the account of the low coral-islands of the Pacific, it will be necessary to anticipate here some portions of our Voyage.

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* Cocos nucifera; bis (Clermont-Tonnerre to Kawaki coral-island). A grove of cocoa-palms, indicated the visits of Polynesians; (of which indeed, we had already obtained at Manhii direct evidence).

† Cocos nucifera; bis (Clermont-Tonnerre to Ahii coral-island). Cocoa-palms occurred rather frequently; yet the island seemed chiefly uninhabited; we saw only four natives, who came towards us in two small canoes.

Pandanus; bis (No. 1 Clermont-Tonnerre to Aratika coral-island). Frequent.

After visiting the Taheitian Group, the Vincennes sailed Westward; and arrived in sight of the lone and widely-insulated Bellinghausen coral-island.

13. Bellinghausen coral-island. It proved to be only "three or or four miles" in diameter, and of the usual annular shape; the lagoon devoid of a proper outlet, though where we landed was an overflowed space, sufficient apparently for an empty boat to be conducted across.

There were no signs of even the visits of natives: sea-birds were breeding unmolested; the tide-pools contained fishes of large size, including a powerful Muræna; the sharks in the lagoon, and a large species of Caranx were fearless; while, on the other hand, the rat, house-fly, and even lizards were all absent. Under these circumstances, the absence of the cocoa-palm, Morinda, and Procris? became significant. And almost equally significant, was the presence of the *Pandanus*.

The vegetable growth consisted of the set of plants we found growing on the Paumotu coral-islands; most of the species being absent from the interposed rocky Taheitian Group, as will be perceived by the following List: which moreover does not include a single additional species:

Lepidium; bis (No. 1 Clermont-Tonnerre to the high coral-island of Metia), but not met with on Taheiti.

Suriana; bis (No. 1 Clermont-Tonnerre to Taheiti, where it was growing on an outlying coral-reef).

Portulaca; compare Meridiana? lutea, and also a true Portulaca to be mentioned presently. Not met with on Taheiti.

Pemphis acidula; bis (No. 1 Taiara to the high coral-island of Metia), but not met with on Taheiti.

Erithalis polygama; bis (No. 1 Taiara to the high coral-island of Metia), but not seen on Taheiti.

Guettarda speciosa; bis (No. 1 Taiara to the high coral-island of Metia); a single tree seen on Taheiti, and this had evidently been planted.

Scævola; bis (No. 1 Clermont-Tonnerre to Taiara coral-island), but not seen on Taheiti.

Tournefortia; bis (No. 1 Clermont-Tonnerre coral-island to Taheiti).

(Pentacarya anomala), Heliotropoid; bis (No. 1 Clermont-Tonnerre to Metia), but not seen on Taheiti.

(Calpidia ovatifolia?; compare No. 1 Henuaki to Aratika coral-island, but not met with on Metia, nor on Taheiti). A tree with bare branches seen in the distance.

Boerhaavia; bis (No. 1 Clermont-Tonnerre to Taiara coral-island, but not seen on Metia, nor on Taheiti).

Achyranthes; bis, (compare No. 1 Clermont Tonnerre to Ahii coral-island).

Cassyta; bis (No. 1 Clermont Tonnerre coral-island to Taheiti).

Urtica; bis, (compare No. 1 Clermont Tonnerre to the high coral-island of Metia), but not seen on Taheiti. Low and herbaceous.

Pandanus; bis (No. 1 Clermont Tonnerre coral-island to Taheiti). Abundant.

Lepturus; bis, (compare No. 1 Clermont Tonnerre to Taiara coral-island, and perhaps Taheiti).

Polypodium; bis (No. 1) Disappointment coral-islands (to Metia, and perhaps Taheiti).

c. Rose Coral-Island.

Continuing Westward, the Vincennes after six days sail, arrived in sight of what was at first mistaken for a rock in mid-ocean. Captain Vanderford, in passing by "nearly twenty years" previously, during "a strong breeze while the surf was beating heavily," had in like manner been deceived.

14. Rose coral-island. As the Vincennes drew near, the supposed rock proved to be a dense clump of trees upon a small coral-island; "in S. Lat. 14° 18′ and W. Long. 168° 05′, and about eighty miles" from the nearest rocky island of the Samoan Group. Rose coral-island, though hardly "two miles" in diameter, was found to contain a lagoon; having a large outlet deep enough to admit a ship, and "six fathoms" inside, except at the centre of the lagoon, where a column of coral-rock rises to within "three feet" of the surface. The tide rising "about five feet," most of the island is submerged at highwater; but the outline continues distinguishable by the line of surf, with here and there a projecting massive coral-block; at all times, we found much water beating over from the windward, and running in streams into the lagoon, and afterwards in a strong current through the outlet.

For the first time on a coral-island, the mineral kingdom was represented; several blocks of vesicular lava being met with by our party; in all instances resting upon the coral-shelf, not imbedded. Two or three of these blocks were seen by myself, the largest weighing perhaps twenty pounds. From the mineral composition, they had evidently been derived from some volcanic island; and there seemed no means of transportation, unless entangled in driftwood. This actually takes place at the Tarawan coral-islands; where Mr. Hale found a native name for "basaltic stones in the roots of trees drifted" to those shores.

Two banks on the rim were never overflowed by the tide; one of them devoid of vegetable growth; the other, containing the above-

mentioned dense grove of trees, found to be three or four acres in extent. The whole flora of the island consisted of but two species of plants: one of them, as will be perceived, additional:

Portulaca (No. 1). Normal; multicaul and prostrate, having the habit of P. oleracea, but much larger flowers; petals five, yellow. Growing in a scattered manner on the top of the beach, and in all instances outside of the grove.

(Calpidia ovatifolia ?); bis (No. 1 Paumotu coral-islands). Constituting the grove; some of the trees being fifty feet high, with the trunk four feet or more in diameter. Additional anomalies of growth were here observed: as two proximate upright branches anastomosing ladder-like at intervals; and several instances of upward-tending branches, as in the trees seen in the distance on Serle and other coral-islands. The timber proved on examination to be brittle and to all appearance worthless.

d. The Otafuan or Union range of Low coral-islands.

At a later period in the Voyage, several coral-islands in the central portion of the Pacific were visited by the Peacock. Lists of the plants growing upon them were communicated to me by Mr. Rich; after the loss of his specimens by shipwreck.

Of the coral-islands of the central Pacific, the nearest are the scattered Otafuan; situated to the Northward of Rose coral-island and the rocky Samoan Group.

15. SWAIN'S CORAL-ISLAND, in "S. Lat. 11° 05′ and W. Long. 170° 55′," and widely detached from any other known island, was visited by the Peacock; and found to be "devoid of a lagoon, and only four miles and three-tenths in circumference." Mr. Rich on landing, observed there the following plants: three of the species being additional:

"Petesia ?" (Compare No. 1 Taiara coral-island to Ahii).*

"Guettarda." (Compare No. 1 Taiara to Metia, and Bellinghausen coral-island).

"Cordia." (No. 1; compare the rocky Taheitian Group).

"Tournefortia." (Compare No. 1 Clermont-Tonnerre coral-island to the rocky Taheitian and Samoan Groups).

"Boerhaavia." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).

"Procris? Sciophila." (No. 1).

"Pandanus." (Compare No. 1 Paumotuan to Bellinghausen coral-island and the rocky Samoan Group).

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* "Cocos." (Compare Paumotuan coral-islands to Taheiti). "The island uninhabited, but covered with cocoa-palms."

"Psilotum." (Compare No. 1 Taiara coral-island to the rocky Samoan Group).
"Polypodium." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Aspidium." (No. 1).
"Asplenium nidus." (Compare No. 1 Taiara coral-island to the rocky Taheitian and Samoan Groups).

16. OTAFU, or Duke of York coral-island. The Peacock also visited Otafu; situated in about "S. Lat. 8° 36′ and W. Long. 172° 24′," and found to be "three miles long by two and a half wide." The natives, according to Mr. Hale, knew of a distant inhabited island called "Pukapuka." On landing, Mr. Rich found the following plants growing upon Otafu: no less than four of the species being additional:

"Pemphis acidula." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).*
"Guettarda." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Scævola." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Convolvulus; several species." (Compare Metia, and the rocky Taheitian and Samoan Groups).
"Cordia." (Compare Taheiti, and No. 1 Swain's coral-island).
"Tournefortia argentea." (Compare No. 1 Clermont-Tonnerre coral-island to the rocky Samoan Group).
"Boerhaavia." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Pisonia; twenty feet in circumference, and forty or fifty high." (Compare Calpidia No. 1 Paumotuan and Rose coral-islands).
"Procris? Bœhmeria? cloth plant." (Compare Disappointment, Raraka, and other coral-islands).
"Urtica." (Compare Paumotuan and Bellinghausen coral-islands).
"Ficus." (No. 1; compare Taheiti and the rocky Samoan Group).
"Pandanus; thirty feet high." (Compare No. 1 Paumotuan to Bellinghausen and the rocky Samoan Group).
"One Gramen." (Compare Paumotuan coral-islands).
"Polypodium." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Asplenium nidus." (Compare No. 1 Pomotuan coral-islands to the rocky Taheitian and Samoan Groups).

17. FAKAAFO, or Bowditch coral-island, situated near the preceding, was also visited by the Peacock. On landing, Mr. Rich found growing there the following plants, one of the species being additional:

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* "Gardenia; the same at Taheiti." (No. 1).
"Morinda." (Compare No. 1 Taiara coral-island to the rocky Taheitian and Samoan Groups).
"Hernandia." (No. 1. Mr. Rich ascertained further, that the tree had been raised by the natives from a seed drifted to these islands).
"Cocos nucifera," (compare Paumotuan and Swain's coral-islands). The "food" of the natives "cocoa-nuts and fish."

"Pemphis." (Compare No. 1 Paumotuan, Bellinghausen, and Otafu coral-islands).*
"Petesia? ; shrubby white-berried Rubiac, seen at Raraka." (Compare No 1 Paumotuan and Swain's coral-islands).
"Guettarda." (Compare No. 1 Paumotuan, Bellinghausen, and Swain's coral-islands).
"Scævola." (Compare No. 1 Paumotuan, Bellinghausen, and Otafu coral-islands).
"———; second species."
"Convolvulus." (Compare Otafu coral-island).
"Cordia." (Compare Taheiti, and No. 1 Swain's coral-island).
"Tournefortia argentea." (Compare No. 1 Paumotuan, Bellinghausen, and Swain's coral-islands).
"Boerhaavia." (Compare No. 1 Paumotuan, Bellinghausen, and Swain's coral-islands).
"Pisonia." (Compare Calpidia No. 1 Paumotuan and Rose coral-islands).
"Achyranthes." (Compare No. 1 Paumotuan and Bellinghausen coral-islands).
"Cassyta." (Compare No. 1 Paumotuan coral-islands to the rocky Samoan Group).
"Boehmeria." (See above, Otafu coral-island).
"Urtica." (Compare Paumotuan, Bellinghausen, and Otafu coral-islands).
"Sciophila; fleshy plant; red flat fruit; Elatostem." (Compare No. 1 Swain's coral-island).
"Ficus." (Compare No. 1 Otafu coral-island).
"Pandanus." (Compare No. 1 Paumotuan coral-islands to the rocky Samoan Group).
"One gramen." (Compare Otafu coral-island).
"Polypodium." (Compare No. 1 Paumotuan to Bellinghausen and Swain's coral-islands).
"Asplenium nidus." (Compare No. 1 Taiara coral-island to the rocky Samoan Group).
"Lichen." (Compare Paumotuan coral-islands).

e. The Vaitupan range of Low coral-islands.

The Peacock visited also the Vaitupan Range "six hundred miles" farther West: yet even at this distance, the natives knew of the Otafuan coral-islands, of "Pukapuka," of "Orosenga" in the Samoan Group, and of Rotuma. On the other hand, Mr. Hale ascertained from the printed accounts, that Dillon heard of Vaitupu at Rotuma, and Cook at Tonga.

18. FUNAFUTI, or Ellice's coral-island. Called a group, but found

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* "Gardenia." (Compare Taheiti, and No. 1 Otafu coral-island).
"Morinda." (Compare No. 1 Paumotuan coral-islands to the rocky Samoan Group).
"Hernandia; small." (See above, No. 1 Otafu coral-island).
"Cocos." (Compare Paumotuan coral-islands to the rocky Samoan Group).
"Palm; flabellate leaves; apparently same Honolulu." (Compare Borassus, No. 1 Samoan and Tongan Groups).
"The natives unacquainted with tobacco."

to be in reality "an extensive ring of small islets situated on a coral-reef surrounding a lagoon."

19. NUKUFETAU, or Depeyster coral-island. Only "three and a half miles" distant from the last. Bananas and yams, produced at a distance on the rocky Groups, were found by Mr. Hale to be known to the natives.

(Pandanus; compare No. 1 Paumotuan coral-islands to the rocky Samoan Group. The plant is mentioned in the Narrative of the Expedition, as growing on the Vaitupan coral-islands; and this is confirmed by the chequered mats made of the leaves, that were procured from the natives).*

20. VAITUPU, or Tracy's coral-island. Visited by the Peacock, and ascertained to be situated in "S. Lat. 7° 28′ and E. Long. 178° 44′." At the last coral-island, the natives stated, that there were "pigs on Vaitupu;" animals rarely kept on coral-islands, from the scarcity of the means of support.

f. The Phœnix range of Low coral-islands.

In sailing from the Feejeean to the Hawaiian Group, the Vincennes passed through the Phœnix tract of low coral-islands; widely-scattered East and West in the vicinity of the Equator, in almost the very centre of the Pacific.

21. GARDNER'S CORAL-ISLAND. We first came in sight of Gardner's coral-island; situated in "S. Lat. 4° 38′ and W. Long. 174° 40′," and found to be only about two miles in diameter, consisting of a narrow rim of land-surface encircling a lagoon. On landing, the lagoon was found to have no regularly-formed outlet; but there was a wide overflowed space, through which it seemed possible to conduct at highwater

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* (Cocos nucifera; bis Paumotuan coral-islands to the rocky Samoan Group. "Cocoa-nuts" are mentioned in the Narrative of the Expedition, as growing on the Vaitupan coral islands).

(Colocasia macrorhiza ?, compare No. 1 Serle coral-island. The "pulaka" spoken of by the natives is supposed by Mr. Hale to be this plant).

(——— antiquorum; No. 2; bis Metia to the Samoan Group. According to Mr. Rich, the "natives said they had taro:" and the statement is confirmed by Mr. Hale).

an empty boat. Rats and lizards, unless brought on drift-wood, indicated, that the island had been visited by natives; but the house-fly and cocoa-palm were absent. In the course of three hours spent on shore, we met with the following plants, three of the species being additional:

Sida? (No. 1). Two feet high; the flowers orange, or yellow.

Nov. Gen. procumbens, (No. 1); Triumfetta of Forster; bis Metia (and the rocky Taheitian and Samoan Groups).

Portulaca (No. 2); perhaps the sp. of Rose coral-island, but the flowers seemed smaller. Growing in tufts, each from a single root; petals five. The stems and leaves edible.

Sesuvium? (No. 1; bis Tongataboo and the rocky Hawaiian Group). Growing in beds; flowers white, the petaloid inner surface of the calyx supplying the place of a corolla; stamens several.

Guettarda; bis (No. 1 Paumotuan coral-islands to the rocky Feejeean Group). Rare.

Scævola; bis Samoa?, and compare (No. 1) Paumotuan coral-islands, but seemed larger and taller. Not very abundant.

(Ipomœa) turpethum? (No. 1); bis Metia (and the rocky Taheitian and Hawaiian Groups, and compare Otafuan coral-islands). Occasionally met with.

Cordia; bis (Taheitian) and Feejeean Groups, and (compare No. 1 Otafuan coral-islands). Not abundant.

Tournefortia (argentea); bis (No. 1 Paumotuan coral-islands to the rocky Feejeean Group). A many-stemmed shrub, ten to fifteen feet high. Extremely abundant.

(Calpidia ovatifolia?); bis (No. 1 Paumotuan and Rose coral-islands, and compare Otafuan coral-islands). Abounding, often forming trees fifty to sixty feet high.

Boerhaavia (compare No. 1 Paumotuan coral-islands); seeming distinct from the Samoan sp. the flowers in capitul. and more ornamental.

Urtica (compare No. 1 Paumotuan, Bellinghausen, and Otafuan coral-islands. Six to twelve inches high; smooth. Rather frequent.

Pandanus; bis (No. 1 Paumotuan to the rocky Feejeean Group); taller, with the leaves longer, narrower, and less glaucous than in the Feejeean upland variety. Not very abundant.

Lepturus (compare No. 1 Paumotuan and Bellinghausen coral-islands); growing in small tufts. Frequent.

Gramen. incert.; growing in tufts. Frequent.

22. McKean's coral-island. Continuing Northward, the Vincennes next came in sight of a small patch of coral, not on the charts; but found to be situated in "S. Lat. 3° 35′ and W. Long. 174° 17′." On drawing near in boats under the charge of Lieut. Alden, it proved to be "three-fourths of a mile long, by half a mile wide." The vegetable growth consisted merely of tufts of *grass* on the top of the island; with here and there some scattered low herbage, which from the boat I supposed to be the Portulaca or Purslane?

23. HULL'S CORAL-ISLAND. Sailing thence Eastward, the Vincennes next came in sight of a coral-island, situated in about "S. Lat. 4° 30′ and W. Long. 172° 21′;" and found to be "four or five miles" in diameter, and containing a lagoon. Here, and throughout this range of coral-islands, the strand seemed of unusual whiteness, so as to be even painful to the eye. On landing, I observed two large fissures in the coral-shelf, with water flowing outwards; though not in sufficient quantity to admit a boat entirely through into the lagoon. In other respects, the coral-shelf proved less continuous than usual, being extensively undermined, with its margin in some places jagged, rent or fissured into narrow projecting slips; presenting another illustration of the origin of massive coral-boulders.

Our party remained on shore for a short time only. We met with no lizards; and most unexpectedly, the Pandanus was absent; but large shrubs were frequent, and a few small trees were growing in one distant spot. The Peacock subsequently visiting this coral-island, Mr. Rich was enabled to make a more thorough examination; and procured here one additional species, as will be perceived by the following List:

Sida?; bis (No. 1) Gardner's coral-island. Herbaceous?, two to two and a half feet high. Mentioned also in Mr. Rich's catalogue.*

"Triumfetta." (Compare No. 1 Gardner's coral-island, and Metia to the rocky Samoan Group). Observed by Mr. Rich.

"Suriana?" (Compare No. 1 Paumotuan to Bellinghausen coral-islands). Observed by Mr. Rich.

"Pemphis acidula; eight feet." (Compare No. 1 Paumotuan to Bellinghausen and Otafuan coral-islands). Observed by Mr. Rich.

Portulaca; bis (No. 2) Gardner's coral-island. Abundant. Mentioned also in Mr. Rich's catalogue.

"Sesuvium." (Compare No. 1 Gardner's coral-island, Tongatabu, and the rocky Hawaiian Group). Observed by Mr. Rich.

Guettarda (bis No. 1 Paumotuan to Gardner's coral-island, and the rocky Feejeean Group). A single stock met with by myself; but others probably observed by Mr. Rich, as the species is recorded in his catalogue.

Scævola; bis Gardner's coral-island (and No. 1 Paumotuan and the rocky Samoan Group). Mentioned also in Mr. Rich's catalogue.

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* Cocos nucifera, (bis Paumotuan coral-islands to the rocky Feejeean Group). The cluster in the distance of a few cocoa-palms was evidently due, (not to recent trading-parties like one then on the island), but to anterior aboriginal visitors. The plant is mentioned in Mr. Rich's catalogue.

"Convolvulus." (Compare No. 1 Otafuan coral-islands, and I. turpethum of Gardner's coral-island, Metia, and the rocky Hawaiian Group). Observed by Mr. Rich.

"Cordia." (Compare No. 1 Otafuan and Gardner's coral-islands, and the rocky Taheitian and Feejeean Groups). Observed by Mr. Rich.

Tournefortia (bis No. 1 Paumotuan to Gardner's coral-island and the rocky Feejeean Group). Perhaps the most abundant plant. Observed by Mr. Rich, in some instances "twenty feet" high.

"Pisonia; thirty feet." (Compare Calpidia No. 1 Paumotuan to Rose, the Otafuan and Gardner's coral-islands). Observed by Mr. Rich. Doubtless the small trees I saw in the distance, near the cluster of cocoa-palms.

Boerhaavia; bis Gardner's coral-island, (and compare No. 1 Paumotuan coral-islands). Frequent. Mentioned also in Mr. Rich's catalogue.

"———; a second species." Observed by Mr. Rich.

Urtica; bis Gardner's coral-island, (and compare Paumotuan, Bellinghausen, and Otafuan coral-islands). Smooth. Mentioned also in Mr. Rich's catalogue.

Gramen. incert. An undetermined grass, growing in tufts. Mentioned also in Mr. Rich's catalogue.

24. Enderby's coral-island. Continuing Eastward, the Vincennes next arrived in sight of Enderby's coral-island; situated in "S. Lat. 3° 8′ and W. Long. 171° 08′," and found to be "three miles long, by two and a half wide;" from the mast-head, having the aspect of a grassy plain, with a few bushes in two separate localities. I could distinguish no variation in level; but those who landed, spoke of a central "depression," and other indications of a shallow dried-up "lagoon, as soft mud, and an incrustation of salt."

The land-surface being "eighteen feet" in extreme height, the "dead tree" lying on the top of the island, could hardly have drifted there without some extraordinary and general overflow. For it may be remarked, that the shelf around coral-islands is an impediment to the dispersion of plants; as it prevents the surf from throwing drifted seeds far enough for the wind to convey them inland. The Pandanus was again absent.

Besides the nautical means of identifying a small coral-island visited by different navigators, this may sometimes be done by the flora, or the plants growing thereon. The specimens collected by Mr. Brackenridge on Enderby's coral-island were examined by myself, and a list made out: subsequently, Mr. Rich communicated a list of the plants growing on one of the Phœnix coral-islands visited by the Peacock. On comparing the two lists, the result is as follows:

Brackenridge.	*Rich.*
Sida?; bis (No. 1) Gardner's coral-island.	"Sida.
Nov. gen. procumbens; Triumfetta of Forst.; bis (No. 1) Gardner's coral-island, &c.	Triumfetta.
Portulaca; bis Hull's coral-island; Mr. B. thinks it distinct from (No. 2) Gardner's coral-island, "more upright and naked stem at base, and leaves decussate."	Portulaca oleracea.
	Sesuvium portulacastrum.
(Ipomœa) turpethum?; bis (No. 1) Gardner's coral-island, &c.	Convolvulus maritimus.
Cordia?; bis, apparently (No. 1) Gardner's coral-island.	Cordia; ten feet high.
Tournefortia; bis (No. 1) Gardner's coral-island, &c.	Tournefortia argentea; eight feet high.
Boerhaavia; bis Gardner's coral-island.	Boerhaavia.
Lepturus (No. 2); compare Tongatabu (and the Feejeean Group); perhaps a peculiar species; a foot or more high, habit of Andropogon. "Very abundant."	One grass.
"A dead trunk of a tree," lying prostrate.	Bamboos, pieces of—drifted on shore—and dead trunk. Rats and lizards."

g. The Nantucket range of Low coral-islands.

Far to the Eastward of the Phœnix Range is a separate tract of widely-scattered low coral-islands.

25. NEW YORK CORAL-ISLAND, situated in "N. Lat. 4° 41′ and W. Long. 160° 15′," was visited by the Peacock and also by the Porpoise; and was observed to be "covered with *cocoa-palms*."

26. JARVIS CORAL-ISLAND, situated in "S. Lat. 0° 22′ and W. Long. 159° 54′," was visited by the Peacock; and, according to the Narrative of the Expedition, was found to be "a mile and three-quarters long by a mile wide, ten or twelve feet high, without a tree or shrub, and but few patches of grass."

In a recent report to the American Guano Company, Mr. Arthur Benson states: that he landed with Dr. Judd on Jarvis coral-island, which he found to be "devoid of vegetation" and containing a "guano-deposit."

27. NEW NANTUCKET, OR BAKER'S CORAL-ISLAND, was next visited by Mr. Benson; who found there "a strip of decayed grass about eighteen inches high, running around the deposits of guano, about two

hundred feet wide; also, a scattering shrub, resembling a dead bush, without fruit or seed, and about eighteen inches high." In regard to the climate Mr. Benson states a fact that seems remarkable and deserving of further inquiry: "that during a stay of thirty days on the Equator," ending the 12th of February, "we had no rain." The Longitude however of Baker's coral-island is not given; and that assigned on some maps marks a position North of or belonging to the Phœnix Range.

h. The Tarawan or Kingsmill range of Low coral-islands.

Westward of the Phœnix Range, the Kingsmill series of large coral-islands is traversed by the Equator. Yet so extensive were the aboriginal wanderings of the Polynesians, that according to Mr. Hale, Cook at Tongatabu heard of Tarawa.

28. TAPUTEOUEA, or Drummond coral-island, in the Kingsmill Range, was visited by the Peacock; and was found to be situated in "S. Lat. 1° 20′ and E. Long. 174° 57′;" probably its Southern extreme, for the island extends "thirty miles" in length. On landing, Mr. Rich remarked the absence of "Lichens, Ferns, and large trees," and met with only the following plants; two of the species being additional:

"Sida." (Compare No. 1 Phœnix coral-islands).*
"Calophyllum inophyllum," (No. 1). "Very small."
"Portulaca." (Compare Phœnix coral-islands).
"Sesuvium." (Compare No. 1 Phœnix coral-islands, Tongatabu, and the rocky Hawaiian Group).
"Guettarda." (Compare No. 1 Paumotuan to Phœnix coral-islands).
"Scævola." (Compare Paumotuan and Phœnix coral-islands).
"Cordia." (Compare No. 1 Otafuan and Phœnix coral-islands, and the rocky Taheitian and Feejeean Groups).

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* "Thespesia" (No. 1), "or perhaps Paritium. Near house, cultivated?"
"Morinda." (Compare No. 1 Paumotuan and Otafuan coral-islands to the rocky Feejeean Group). Mentioned also by Mr. Hale, as called "non" by the natives.
"Ficus." (Compare No. 1 Otafuan coral-islands). "Perhaps cultivated."
"Cocos." (Compare Paumotuan to Phœnix coral-islands). "Molasses from cocoa-trees; also paste from mixture with Pandanus." According to Mr. Hale, the aboriginal settlers found the cocoa-palm already on these islands.
"Arum cordifolium." (Compare Colocasia macrorhiza, bis No. 1 Vaitupan coral-islands). "Cultivated."
"——— esculentum." (Compare Colocasia antiquorum, bis No. 2 Vaitupan coral-islands). "Cultivated." According to Mr. Hale, the plant was brought "from Banabe" or Ascension, a rocky island.

"Euphorbia." (Compare No. 1 Paumotuan coral-islands, Tongatabu, and the rocky Feejeean Group).
"Ficus? Rubiac.?; shrub, hairy leaves; no fruit, nor flowers."
"Pandanus." (Compare No. 1 Paumotuan to Phœnix coral-islands. The fruit used in the mixed cocoa paste mentioned below). According to Mr. Hale, the aboriginal settlers found the plant already on these islands.
"Three grasses." (Compare Paumotuan, Bellinghausen, Otafuan, and Phœnix coral-islands).

29. Apia, or Charlotte coral-island, to the Northwest, was visited by the Peacock; and was found situated in "N. Lat. 1° 52′ and E. Long. 173° 02′," and containing a lagoon. Mr. Rich on landing, found Apia "more promising to the botanist," and observed here the following plants:

"Sida." (Compare No. 1 Phœnix and Taputeouea coral-islands).*
"Triumfetta." (Compare No. 1 Phœnix coral-islands and Metia, to the rocky Taheitian Samoan Groups).
"Portulaca tuberosa?"
"Guettarda; new species?."
"Scævola." (Compare Paumotuan to Phœnix and Taputeouea coral-islands). "Rice-paper made from the root."
"Euphorbia." (Compare No. 1 Paumotuan and Taputeouea coral-islands, Tongatabu, and the rocky Feejeean Group).
"Urtica ruderalis?;" (regarded by Mr. Rich as identical with the Paumotuan species; compare also Bellinghausen and the Phœnix coral-islands).
"Pandanus." (Compare No. 1 Paumotuan, Otafuan, Phœnix and Taputeouea coral-islands).
"Gramen." (Compare Paumotuan, Bellinghausen, Otafuan, Phœnix, and Taputeouea coral-islands).

30. Taritari, or Pitt's coral-island, regarded as the most important island of the range, was also visited by the Peacock; and was found to be "fourteen miles long," with its Southern extreme in "N. Lat. 3° 08′ and E. Long. 172° 48′." Mr. Rich did not have an opportunity of landing; but considers Taritari as the "most promising island to the botanist," and as probably affording an unusual variety of plants. The natives brought off branches of a plant not seen elsewhere on coral-islands; the

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* "Morinda." (Compare No. 1 Paumotuan, Otafuan, and Taputeouea coral-islands, and the rocky Taheitian and Feejeean Groups).
"Ficus." (Compare No. 1 Otafuan and Taputeouea coral-islands).
"Cocos." (Compare Paumotuan to Phœnix coral-islands).

"Rhizophora" (or mangrove. No. 1; compare the rocky Samoan and Feejeean Groups).*

31. MAKIN CORAL-ISLAND. A small coral-island, an appendage of and situated close to Taritari. Mr. Rich, on landing upon Makin, found there the following plants:

"Tournefortia argentea." (Compare No. 1 Paumotuan to Phœnix coral-islands).
"Pisonia." (Compare Calpidia ovatifolia?, No. 1 Paumotuan to Phœnix coral-islands).
"Boerhaavia." (Compare Paumotuan and Phœnix coral-islands).
"Urtica ruderalis?" (Compare Paumotuan to Phœnix and Apia coral-islands).
"———; another" (species).

i. The Radack range of Low coral-islands.

32. MILLE, or Mulgrave coral-island. Mr. Hale obtained some information respecting Mille coral-island, situated to the Northwest of the Kingsmill Range; and learned, that the natives in like manner possess the *bread-fruit*, in addition to the *Pandanus* and *cocoa-palm*.

j. Wake's Coral-island.

33. WAKE'S CORAL-ISLAND. Far to the Northwest of the Radack Range, Wake's coral-island, in "N. Lat. 19° 11′ and E. Long. 166° 31′," was visited by the Vincennes; and was found to be "six miles" in diameter, and containing a lagoon; though, for one-half of the circumference, the rim was even with the surface of the ocean. The coral-strand was observed to be as white as in the Phœnix Range; the extreme elevation, being about "eight feet" above high water.

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* (Physalis edulis?; compare the rocky Taheitian, Feejeean, and Hawaiian Groups, and No. 7 Peru). According to the Narrative of the Expedition, one of the resident Whites spoke of a kind of "fruit resembling a gooseberry."

(Artocarpus incisa; No. 1). "Gray," a resident White, informed Mr. Rich, that the natives "have bread-fruit." Mr. Hale learned further from the natives, that the "bread-fruit was brought by the Amoi people;" (probably either from Samoa, also called Hamoa, or from Maui in the Hawaiian Group).

(Colocasia? or compare Tacca?). Gray further stated, that the natives "have two kinds of potatoes;" (meaning possibly, as Mr. Rich suggests, yams?)

On landing, the coral-shelf was found to be broken and irregular, narrow, and in some places hardly extending outwards from the strand or beach: where constituting the overflowed rim, the water seemed in all places too shallow, to admit anything more than an empty boat into the lagoon. A dead tree lying prostrate, seemed to have drifted to its resting-place; and the seed of a *Mucuna*, picked up by Mr. Rich, must certainly have floated hither from some rocky island. Beyond the limit of my own excursion, some of our party met with "marks of a hurricane that had passed over the island from the Northeastward." The house-fly and cocoa-palm were absent; and there were no certain indications of the visits of natives; for the lizards, and even the rats, might have arrived on drift-wood.

There were no growing trees; the Pandanus was absent (as from some of the Phœnix coral-islands); Urticeæ were also absent. During more than five hours on shore, the following were the only plants met with: two of the species being additional:

Lepidium (compare No. 1 Paumotuan and Bellinghausen coral-islands), and apparently the fleshy-leaved species seen at Oahu. Found by Mr. Rich.

Sida; apparently (No. 1) Phœnix coral-islands. Rare.

Pemphis; bis (No. 1 Paumotuan to Phœnix coral-islands). The prevailing plant; growing ten to fifteen feet high, and often clustered, the stout stems nearly uniting at the roots into a tree-like base.

Portulaca; bis, apparently (No. 2) Hull's coral-island and Oahu. Sub-erect, a foot high; the stems and leaves slightly acid.

Sesuvium; bis (No. 1 Phœnix coral-islands), and compare Tongatabu and the rocky Hawaiian Group. The flowers purple. Abounding in inland depressed situations.

Scævola; bis, (compare No. 1 Paumotuan to Phœnix coral-islands). Very rare; found by Mr. Brackenridge.

(Ipomoea) turpethum?; compare (No. 1) Phœnix coral-islands; but not in flower.

Cordia; bis Oahu, and compare (No. 1) Phœnix coral-islands; "young." Found by Mr. Brackenridge.

Tournefortia (bis No. 1 Paumotuan to Phœnix coral-islands). Stout-stemmed, and ten to fifteen feet high. Abundant.

(Pentacarya? No. 2, or compare) Tournefortia; seems new, but Mr. Brackenridge thinks it the small Paumotuan species. Woody, one to three feet high.

Boerhaavia (No. 2; compare Hull's coral-island); bis?, near the small-flowered species of the Feejeean and Hawaiian Groups, &c. Stems spreading over the ground, the under surface of the leaves red, or sometimes white.

Lepturus; bis? (compare No. 1 Paumotuan to Bellinghausen and Phœnix coral-islands) Growing in tufts; the stems dichotomous, with crowded, narrow, short leaves; not in flower.

Gramen incert., (No. 1; compare Tarawan coral-islands). Single-stemmed, and large-leaved; resembling young Phragmites.

On reviewing the vegetable growth on the thirty-three coral-islands above described, the species of plants, about thirty-eight in number, are probably no one of them peculiar, but are all East-Indian and submaritime; several however, extremely rare on the rocky groups and hardly seen growing in mineral soil. On the other hand, certain submaritime plants frequent in the mineral soil of the rocky groups, did not occur on the low coral-islands.

Independent of the character of the soil, coral-islands situated in the midst of or in the close vicinity of rocky groups, partake of the vegetable growth on those groups: as do the few coral-islands that have been elevated, pushed up out of the ocean by geological causes.

The low mid-ocean coral-islands are thus found to contain the same set of plants in all parts of the Pacific; and beyond these few ascertained species, do not facilitate the transmission of seeds from one rocky group to another. The coral-islands are therefore of no importance in Botanical geography; and being omitted, the rocky groups of the Pacific resolve themselves into well-defined botanical regions:

1. The Taheitian Island-region.

Returning now to the Order of our Voyage. On the 8th of September, 1839, the Vincennes sailing Westward along Rairoa, reached at sunset the farther end; and turning South, took leave of the Paumotu archipelago of low coral-islands.

a. Metia.

They who have long sailed among ring-shaped reefs can appreciate the excitement produced on deck, at daybreak on the 9th, by the announcement of a "real island." From the position, one hundred miles North of Taheiti, clearly Metia, or Aurora Island. There stood the land, high out of the water: yet there was something unusual in its aspect; explained on drawing near: the island, three or four miles in length and width, proving flat-topped, abruptly-terminating all around in a vertical cliff two hundred and fifty feet high; or where the base was in some places extensively undermined, actually out-hanging over the ocean.

In coasting around in a boat with Captain Wilkes, the cliff seemed to continue vertical from a vast depth in the ocean; but approaching the surf as near as consistent with prudence, we were enabled to distinguish living coral through the clear water, and to obtain soundings; evidently on fallen portions of the cliff. That the mid-ocean coral-islands are margined by vast submarine precipices, had been already proved by attempts at sounding from the Peacock: "About a mile from one of the coral-islands we first visited, Captain Hudson let down eleven hundred fathoms of line, without reaching the bottom." On second trial at a different spot, "after striking the bottom at three hundred fathoms, the lead slipped off, and descended as many fathoms more without striking; but the line brought up an entangled fragment of coral; giving evidence, that the strike was on the edge of a vertical or overhanging precipice."

As the boat kept close under Metia, the face of the cliff presented marks left by portions that had fallen off; many of them very extensive, but the fallen masses however huge, had disappeared beyond the reach of the lead in the depths of the ocean. Other portions of the cliff were evidently on the point of falling. In the absence of all means of access, the island seemed a fortress that might defy the world: but continuing around, we at length arrived at a slight strip of beach at the base of the cliff, affording a landing-place. Another accessible spot was found in a different part of the island; and Mr. Agate, landing there from one of our boats, climbed a steep ascent consisting of a succession of ledges, and succeeded in reaching the summit.

The natives on the beach above-mentioned, received us in a friendly manner; and we were conducted by a pass, part of the way rendered practicable by art, to the top of the island. From the brink, there was a very gradual rise for the first hundred yards, and then a perceptible descent; and at the end of about a mile, the trees being more thinly scattered, we gained a somewhat extended view over what seemed a slight central depression; perhaps only a general inclination towards the opposite margin, which was concealed by trees. For it was soon perceived, that the top of the island was not level; the end on which we landed being thirty or forty feet higher than the farther one.

The island consisted exclusively of coral; the component species identical with those of the low coral-islands, all made up in like manner principally of conglomerated "Astreas." Metia is therefore a low coral-island, that by some local geological cause, has been pushed

up out of the ocean to its present elevation. During the geological Period now pending, and termed "Alluvial," this vast mass of coral-limestone had formed in the sea; its emerging even, being at an epoch too remote for the memory of man.

From the boat, vertical and vein-like fissures were observed in the face of the cliff; but more conspicuous at different elevations, were some perfectly horizontal lines of open-mouthed caves, seeming as though formed by the action of surf; if really so, the rising above the the ocean must have been gradual, or at least at successive epochs.

On close examination, the imbedded shells and fragmentary corals were found to be the same throughout, from the top of the cliff to the base; and all of them belonging to existing species. Independent of the marine species, Mr. Dana found "some imbedded land shells, Bulimi;" perhaps entangled by the percolation of rain-water; for stalactites were observed in the above open-mouthed caves. Living *land shells* were, however, met with by Mr. Couthouy; and though minute, have proved peculiar species. The only instance of the kind we met with on coral islands: but it has been already stated, that the question of the contemporaneous origin of species may, perhaps, be one day solved on Metia.

Vatu-lele, the other elevated coral-island seen during our Voyage, is in the close vicinity of rocky islands; and will be described in the account of the Feejeean Group.

The Vegetable Growth. I met with no marks of torrents on Metia, nor with running water, nor even with springs; yet the soil was kept sufficiently moistened by the rains, for the production of large trees and a luxuriant forest-growth: much of which had been cleared away, at different times, for the purposes of cultivation.

In the absence of mineral soil, the flora proved chiefly interesting from the presence of many rocky-island species. Of the plants we met with, the *Capparis* and *Aspidium* were not seen elsewhere; of the remainder, the rocky-island species were all found subsequently either on Aimeo or Taheiti; while some coral-island species were growing on Metia, that did not occur on any other high island. This will appear by the following List:

Lepidium; bis (No. 1 Paumotuan) coral-islands.*
Capparis (No. 1); decumbent. Growing near the beach.

* (Cardamine sarmentosa, Forst.; No. 1). Humble; leaves pinnatisect, mostly radical; flowers having a purple tinge. (Afterwards seen on Taheiti.)

(Paritium) tiliaceum, (No. 1; compare Brazil. Afterwards seen on Taheiti).

Nov. gen. procumbens, (No. 1); Triumfetta of Forster. A procumbent vine; leaves roundish-cordate; flowers yellow. Maritime. (Afterwards seen on Aimeo, and on the Phœnix coral-islands).

Calophyllum (inophyllum; No. 1); a magnificent tree. Frequent on the flat summit of the island. (Afterwards seen on Taheiti, and by Mr. Rich on the Tarawan coral-islands).

Dodonæa (No. 1; compare Brazil and Lower Peru. Afterwards seen on Taheiti).

(Xylosma? No. 1). A shrub; leaves alternate, oblong, acute at each end, crenately dentate, reticulate; (compare the Betuloid shrub afterwards seen on Taheiti).

Gossypium (religiosum?; No. 1). A spreading shrub, six to eight feet high. (Afterwards seen on Taheiti).

Sida (No. 2); near S. spinosa. A frequent weed. (Afterwards on Taheiti).

Urena (No. 1); leaves slightly trilobed; flowers not seen; the fruit echinate. (Afterwards seen on Taheiti).

Cardiospermum (No. 1). Apparently only naturalized. (Afterwards seen on Taheiti).

Spondias dulcis, (No. 1); the vi-plum. In the fertile soil of the flat summit of the island. (Afterwards seen on Taheiti).

(Tephrosia piscatoria, No. 1); the pod not alate. Naturalized. (Afterwards seen on Taheiti).

Desmodium (purpureum; No. 2); flowers purple, in a dense raceme. (Afterwards seen on Taheiti).

Abrus precatorius, (No. 1). Apparently only naturalized. (Afterwards seen on Taheiti).

(Pachyrhizus? No. 1; recorded as) Dolichos?; leaves trifoliolate. Cultivated for its "esculent yam-like root;" (see Tongatabu).

Carica papaya, (bis No. 1 Tropical America). Cultivated; and a favorite fruit with the natives. (Afterwards seen on Taheiti).

Morinda; bis (No. 1 Paumotuan) coral-islands. The ripe fruit edible. (Afterwards seen on Taheiti).

Siegesbeckia (No. 1); normal. Growing as a weed. (Afterwards observed on Taheiti).

(Batatas edulis; No. 1, bis Peru and Brazil); the flowers seemed smaller than in the variety we have in the United States; the roots also smaller and more fibrous, yet of good quality. Cultivated in patches on the flat summit of the island. (Afterwards seen on Taheiti).

Nicotiana tabacum, (bis No. 6 North America). Cultivated in a few small patches around the houses of the natives. (Obtained from trading and colonial Whites, perhaps at Taheiti).

(Leucas decem-dentatus, No. 1. In cultivated ground. Afterwards seen on Taheiti).

Boerhaavia (procumbens?, No. 3); flowers minute. (Afterwards seen on Taheiti).

Achyranthes (No. 2); seeming distinct from sp. of Paumotuan coral-islands. On the flat summit of the island. (Afterwards seen on Taheiti, and compare Bellinghausen coral-island).

Amaranthus (No. 1). Growing as a weed, and probably introduced.

Aleurites triloba, (No. 1); the stocks all young, with the leaves mostly five-lobed. Frequent, but probably planted. (Afterwards seen on Taheiti).

Broussonetia papyrifera, (No. 1). A tree, in one instance forty feet high; the branches

(Colubrina Asiatica; No. 1); Ceanothus capsularis of Forster. (Afterwards seen on Taheiti).

Desmodium (No. 1); near D. gyrans; flowers distant, or in lax racemes. (Compare sp. seen afterwards on Taheiti).

Pemphis; bis (No. 1 Paumotuan coral-islands).

Barringtonia speciosa, (No. 1); a frequent and magnificent tree. I could not find that any use was made of it by the natives; (see Feejeeans. The tree afterwards observed on Taheiti).

Cucumis (No. 1); leaves three to five-lobed; flowers yellow; fruit small, like a diminutive water-melon, and entirely smooth, bitter. (Afterwards seen on Taheiti).

Guettarda speciosa; bis (No. 1 Paumotuan) coral-islands. (Afterwards seen planted on Taheiti).

(Ipomœa) turpethum, (No. 1); the capsule inflated. (Afterwards seen on the Phœnix coral-islands, and compare sp. on Aimeo).

(———) pes-capræ, (No. 2; compare Brazil). Maritime. (Afterwards seen on Taheiti).

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spreading; the leaves large, sometimes eight inches wide, cordate and often trilobed. Planted. (Afterwards seen on the Samoan Group).

Artocarpus incisa, (No. 1). Planted. (Afterwards seen on Taheiti; and heard of by Hale and Rich, as growing on the Tarawan and Radack coral-islands).

Casuarina equisetifolia, (No. 1. Afterwards seen on Taheiti).

Musa paradisica, (No. 1, bis Brazil and Peru); the banana. Cultivated. (Afterwards seen on Taheiti).

Dracæna terminalis, (No. 1). Frequent on the flat summit of the island, apparently cultivated. (Afterwards seen on Taheiti).

Dioscorea (No. 1); broad cordate leaves; neither flowers, nor fruit. In cultivated ground and neglected clearings. (Probably a species afterwards seen on Taheiti).

Tacca pinnatifida, (No. 1). Planted. (Much more abundant than on Taheiti).

(Colocasia) macrorhiza? (No. 1; compare Serle and Vaitupan coral-islands, and Taheiti). The young leaves.

(——— antiquorum; No. 2; compare Vaitupan and Tarawan coral-islands). Cultivated. (Afterwards seen on Taheiti).

Cocos nucifera, (bis Paumotuan coral-islands and No. 1 Tropical America). In regular plantations, both along the beach and on the flat summit of the island.

Cyperus (No. 1); glaucous. (Afterwards seen on Taheiti).

Mariscus paniceus, (No. 1. Afterwards seen on Taheiti).

Paspalum (No. 1. Afterwards seen on Taheiti).

———; perhaps a second species.

(Digitaria, compare No. 1 Paumotuan coral-islands); near Milium paspalodes. (Afterwards seen on Taheiti).

Cenchrus (calyculatus, No. 1); spike of three or four capitul. (Afterwards seen on Taheiti).

Eleusine Indica, (No. 1, bis United States). Frequent, and apparently introduced. (Afterwards seen on Taheiti, Samoa, Tongatabu, the Hawaiian Islands, Zanzibar, and in Oman).

Saccharum officinarum, (No. 1. The degenerate, juiceless, slender-stemmed variety, afterwards seen naturalized on Taheiti and the other Polynesian Groups).

Tournefortia; bis (No. 1 Paumotuan coral-islands).

(Pentacarya anomala; bis (No. 1) Paumotuan coral-islands. (Afterwards seen on Bellinghausen coral-island).

(Premna, No. 1; recorded as) Aegiphiloid? A shrub; leaves sub-opposite, petioled, slightly cordate, entire; inflorescence cymose; calyx and corolla 4-fid; stamens four, style single. Frequent. (Afterwards seen on Aimeo).

Cassyta; bis (No. 1) Paumotuan coral-islands. (Afterwards seen on Taheiti).

Gen. incert. (No. 1). A vine; the leaves trifoliolate.

Gen. incert. (No. 1). Having the habit of Limonia; suffruticose, eighteen inches high; leaves opposite, petioled, ovate, entirish; not seen in flower.

Euphorbia; bis (No. 1) Paumotuan coral-islands. (Afterwards seen on Taheiti).

Urtica; bis Paumotuan coral-islands.

Boehmeria, (see Taheiti).

Ficus? (No. 2); the stems articulate while young; leaves large, oblong, penninerved, with the nervures anastomosing; neither flowers, nor fruit. (Afterwards seen on Taheiti).

(Sciophila) lucida, (No. 1. Afterwards observed on Taheiti; compare also Otafuan coral-islands).

Peperomia (No. 1. Afterwards observed on Taheiti).

(Oberonia equitans, No. 1); gen. Orchid. Epidendric; the leaves gladiate and equitant; small green flowers. Found by Mr. Agate on the opposite side of the island. (Afterwards seen on Taheiti).

Pandanus (bis No. 1 Paumotuan coral-islands; and afterwards seen on Taheiti).

Davallia (No. 1); epidendric, and resembling the Madeira species. (Afterwards seen on Taheiti).

Polypodium; bis (No. 1) Paumotuan coral-islands. (Afterwards seen on Taheiti?).

(Nephrodium No. 1; recorded as) Aspidium; habit of A. exaltatum; frond with the upper segments auriculate; no fructification.

Asplenium; bis (No. 1 Paumotuan coral-islands. Afterwards seen on Taheiti).

Musci incert. One or more species of mosses met with.

Ramalina? (Afterwards seen on Taheiti; compare No. 1 Paumotuan coral-islands).

b. Taheiti and Aimeo.

Continuing South, the Vincennes on the 10th came in sight of "land," distant not less than "forty miles." For a long time, we had difficulty in distinguishing it; but at length, high up among the clouds, an exceedingly faint outline was discerned, and ascertained to be permanent. This was Oroena, the lofty central mountain of Taheiti, termed by the natives, the "pin of the island." From a double summit, "eight thousand five hundred feet" above the sea, the descent is with imposing steepness; but by degrees the sides diverge, and terminate below in a broad base. For from the elevated centre of this singularly circular body of land, the mountain-ridges all extend out-

wards; dividing, subdividing, and diminishing in altitude until they reach the sea.

As the Vincennes approached and entered the harbor at Matavai, the summit of Oroena continued in sight; but was now less prominent, with diminished grandeur in the scenery, the mountain ridges being chiefly concealed by gently-rising, swelling slopes.

Geological structure. Like most high ocean islands, Taheiti is volcanic. It is however surrounded by a reef of coral; leaving openings deep enough to admit large vessels, opposite the mouth of the principal streams; the inside passage, an eighth of a mile to a mile wide, affording sheltered boat-navigation around almost the entire circumference.

The mineral shore of the island is almost everywhere alluvial, composed of blackish volcanic sand; but here and there, a ridge extends outwards to the sea in a rocky bluff. The prevailing rock throughout the island, was observed to be compact, and was termed by Mr. Dana "basaltic:" conglomerate or pebble-rock being occasionally intermixed, and in some spots vesicular lava; but there were no lava-streams, nor active volcanoes, no pumice, obsidian, nor even hot-springs. In drawing comparisons with the distant continents at the time of writing my journal, I could not recollect meeting with either quartz, mica, or mineral carbonate of lime on Taheiti.

The marginal portion of Taheiti. In the vicinity of the seacoast, the climate is warm. On the North side of the island, Dr. Fox found the subterranean or approximate mean annual temperature "79° Fahr.;" which is "higher than that of Brazil." The South or windward side of the island, being less sunny with more rain, is probably cooler. Thunder was once heard, during our stay. From the South side of Taheiti, the sunset of the 17th proved the most gorgeous I ever witnessed; the clouds in the West being lighted up with sun-like lustre; with, in the East, a brilliant rainbow of several concentric arcs, perfect for more than a semicircle. Residents spoke of occasional "storms from the Westward;" rendering, during their continuance, the harbor at Matavai "unsafe."

On the North side of the island, the swelling slopes and ridges, to the elevation of about a thousand feet, are barren and devoid of trees; and overgrown with tangled fern, a *Gleichenia*, here a foot or two high; *grasses* being so rarely intermingled as to occur singly. *Metrosideros villosa*, a low shrub having scarlet flowers, made its ap-

pearance in the upper part of this district, and became abundant. A few other plants were intermingled: as the *Dodonœa*, restricted in some measure to certain localities; *Daphne fœtida*, also local; a *Lycopodium*, in the beds of fern; and two plants with which we had become familiar on coral-islands, *Euphorbia ramosissima* and the *Cassyta*.—In ascending above the elevation of a thousand feet, the *Gleichenia* growing taller more exclusively took possession of the soil, and at length became entangled and difficult to penetrate: while in exposed situations, some shrubs began to show themselves, which though nowhere abundant, yet deserve mention: as a *Myrsine* that might be mistaken for a Myrica; the *Vaccinium cereum;* and the *Cyathodes*, belonging to the Epacris tribe.

In the valleys, and their expansions at and along the sea-coast, the original forest is chiefly extinct, having long been removed for the purposes of cultivation. The submaritime *Paritium tiliaceum*, however, maintains its ground, in tracts, that at the bottom of low valleys extend some distance inland; the component trees, thirty feet high with the trunk two feet in diameter, sending down long branches that geniculate on reaching the ground, or taking root, give rise to new trunks; while other exposed trunk-like roots send up trees at regular intervals; in short, the whole tract of interlaced trunks and branches forming a sort of tree-thicket; which, however, offers no very serious impediment to the traveller.—Of large forest-trees growing in the valleys near the coast, the *Inocarpus* may have been once the most frequent; the *Calophyllum* and *Barringtonia* being intermingled, both of them large and magnificent trees. Among the trees of medium and inferior size, a *Ficus*, having something of the aspect of Inocarpus, was observed to be frequent; the *Glochidion* or tree-Phyllanthus, growing chiefly in open situations, and sometimes thirty feet high, with spreading pendent branches.

From the trunks and branches of large trees, *epidendric ferns*, as *Davallia*, *Niphobolus*, and others, were conspicuously prominent; and even *epidendric Orchidaceæ*, were by no means rare. But the most remarkable plant I met with in this lower portion of Taheiti, was a *Convolvulus;* a stout woody vine, tangled and twisted, and rising around the outer branches of trees after the manner of ship-rigging, to mantle the tallest summits with foliage and flowers. The most frequent shrubs were *Colubrina Asiatica*, and *Chiococca barbata;* both of them six to eight feet high, and observed to withstand the deepest shade of the forest.

One or two marshy spots occur in the lower portion of Taheiti; and were found filled with *Acrostichum aureum*, growing in large tufts; and a more humble fern profusely intermingled, a *Polybotrya?* resembling our Northern species of Thelypteris.

The Interior or mountain forest. All around the island, the mountain-ridges presented a gentle and easy ascent; but on attempting to proceed inland, the crest, after a few miles, commenced narrowing, until at last the traveller finds himself on the top of a thin partition-wall of rock, hundreds of feet high. I was of a party that persevered for hours, on the ridge leading back from Matavai; but, at the limit of our hazardous excursion, we were yet many miles from the central mountain. Another of these lofty partition-walls, thin to the base, was observed on looking upwards to have its summit deflected at one point and curled over.

In crossing the island, by the way of Pupino Valley and Lake Waihiria, the wildness of mountain scenery is, perhaps, unrivalled. From a practice, by the natives, of disseminating seeds and plants through the forest, the fehi-banana having a conspicuous crown of leaves, has become identified with the scenery of the Interior; projecting from places hopelessly inacessible, from the face of dripping precipices; some so lofty, that cascades after falling a certain distance, are cut off in mid-air, and dissipated in spray.

During the four days we spent in the Interior, the rain was almost continual; the climate being decidedly more humid than around the coast, and also comparatively cool. The following observations of the temperature, were taken on my two mountain excursions:

Sept. 14th; in Pupino Valley, at our first encampment, the elevation estimated at three hundred feet; 5¾ A.M., rainy,	65° Fahr.
Sept. 14th; in Pupino Valley, elevation estimated at 1000 feet; 11¼ A.M.,	70° Fahr.
Sept. 14th; in Pupino Valley, West branch of, at our second encampment, the elevation estimated at 2500 feet; 4¼ P.M.,	63° Fahr.
Sept. 15th; at the same encampment; 6¼ A.M.,	64° Fahr.
Sept. 22d; on the top of the ridge leading back from Matavai, the elevation estimated at 4500 feet; 2 P.M., cloudy; on the ground,	61° Fahr.
Sept. 22d; at the same place a few minutes afterwards, the thermometer suspended in the air,	61° Fahr.
Sept. 23d; at our encampment on the Western flank of the same ridge, the elevation estimated at 2500 feet; 5 A.M.,	62° Fahr.
Sept. 23d; at the same encampment, a few minutes afterwards; the thermometer placed in the water of the stream, near its source.	63° Fahr.

Throughout the Interior, the forest appeared to have been very generally stripped of large trees; or perhaps, these were never abundant. There was certainly very little variety: the largest of those clearly indigenous being the "*apapi*," of the size of an oak, and having pinnate leaves: but a *Coffeaceous* tree, with beautiful, dark-green, shining foliage, was sometimes fifty feet high, and the trunk two and a half feet in diameter; a spreading *Clusia-like* tree, exceeded forty feet in height; a *Rhus*, growing in tracts or scattered groves, occasionally approached these dimensions; and an undetermined genus (perhaps a *Ficus*) seemed to deserve a place among trees, although having instead of a solid trunk only intertwined and tangled roots, exposed to the height of ten feet when standing isolated, or when resting against the face of precipices, to that of thirty feet.

Tree-ferns constitute a principal ornament of the Interior forest; their crowns in looking downwards from the mountain-ridges, being everywhere intermingled. Of three species: the most frequent, was sometimes more than thirty feet high; another, the *Angiopteris evecta*, was less prominent in the distant landscape from being low, although its wide-spreading fronds radiated in some instances eighteen feet from the central trunk.

The trunks and branches of the older forest-trees, seldom free from *epidendric plants*, were sometimes almost clothed with them: principally epidendric ferns; as tufts of the grass-like fronds of *Vittaria*, hanging down five or six feet; *Ophioglossum pendulum*, of almost equal length; a pendulous *Psilotum;* and three or four *epidendric Lycopodiums*. But intermingled, a *Peperomia* was frequent; the *Sciophila*, in some instances clearly epidendric; and less frequent than along the coast, a few *epidendric Orchidaceæ*. Also, minor Cryptogamous plants growing on the bark of trees, as *Hymenophyllum* and *Trichomanes;* several fine *Lichens;* and a variety of *Mosses* and *Hepaticæ*, the latter sometimes overrunning living leaves.—Of real *parasitic plants*, coming out of the branches of trees: an *Arceuthobium*, or jointed aphyllous Viscum, was often met with in the Interior; the *Loranthus*, with its scarlet flowers, seeming rare.

Woody *Vines* proved rare in the mountain forest; but among the herbaceous kinds, were two ornamental *twining ferns*. *Shrubs*, on the other hand, were abundant and in great variety; many of them large and arborescent; a few species ornamental, the remainder having inconspicuous flowers. The most frequent shrubs were *Urticeæ;* and

next, *Coffeaceæ;* two broad-leaved species of *Piper* seeming however very generally diffused. In many places, the *Freycinetia*, in the form of a decumbent shrub, almost exclusively constituted the undergrowth; besides inclining in long weak stems down steep declivities.

As elsewhere in luxuriant forests, the ground between the stems of the trees and shrubs, was chiefly occupied by a flourishing growth of *ferns;* here, however, in unusual variety. In the deep shade, large ferns became more thinly scattered, and certain humble and tenderly-herbaceous plants made their appearance: as, a *Desmochæta;* two or three *ground Orchidaceæ;* a dentate-leaved *Elatostema;* and even some grasses, the *Orthopogon*, and *gen. Poa-like.* Again in the deep shade, between the stems of all the above, the ground was coated with a moist growth of diminutive Cryptogamous plants: consisting principally of intermingled *Mosses* and *Hepaticæ*, and a moss-like *Lycopodium:* the larger species of *Fungi* being by no means wanting.

Openings devoid of trees and of considerable extent, were occasionally met with: and were usually occupied by a dense bed of an *Amomum;* three feet high, covering over, and almost excluding the sun from the footpaths made by the natives.

The crest of the Interior mountain-ridge, between Pupino Valley and Lake Waihiria, proved the most productive botanical ground we visited; being, although extremely narrow, exposed to the sun. We found growing upon it, *Commersonia echinata*, *Weinmannia parviflora*, an *Alstonia*, a Veratrum-like *Hamelinia?*, *Gahnia schœnoides*, and several singular epidendric *Orchidaceæ* and *Ferns.*

Character and composition of the vegetable growth. There seemed to be but two prevailing Families of plants:

1. *Filices* or Ferns. Dominant, as on other fertile ocean-islands; and conspicuous in almost all situations, whether dry or moist; not only on the trunks and branches of trees, but on the ground in the forest, and even throughout the open districts.

2. *Urticaceæ.* Next in order of frequency, and from their size, often more prominent; consisting chiefly of trees and shrubs; but including some herbaceous plants.

The four following Tribes of plants were, however, of very frequent occurrence:—*Coffeaceæ*, chiefly consisting of shrubs, some of them arborescent, and one becoming a tree of medium size.—*Myrtaceæ*, the *Metrosideros* abounding in somewhat elevated open situations.—*Euphorbiaceæ*, including one small tree and several shrubs.—And *Orchidaceæ*,

herbaceous plants and mostly epidendric, but including some ground species.

After leaving America, we entered the domain of the East Indian plants, at the coral-islands; where were only a few submaritime species. The transition was more striking at Taheiti; there being no longer doubt as to the the disappearance of Cactaceæ and Bromeliaceæ; Bromelias being replaced by *Pandanaceæ;* Tillandsias by *epidendric Melanthaceæ;* and Begonias and Dorstenias by *Elatostemas.* In fact, almost the only BRAZILIAN CONNECTION that could be distinguished, was in the abundance of *Urticeous shrubs.*

NEGATIVE CHARACTERS. Unlike continental countries, *Grasses* and *Cyperaceæ* compose but an insignificant portion of the indigenous vegetable growth; being so thinly scattered, as hardly to attract notice. *Compositæ* are even more rare; and we met with but a single species that is clearly indigenous.

The following list of missing Tribes comprises only the principal ones; those whose unexpected absence seemed characteristic:

Ranunculaceæ,	Rosaceæ,	Polygonaceæ,
Dilleniaceæ,	(Rhizophoraceæ),	Lauraceæ,
Magnoliaceæ,	Combretaceæ,	Myristicaceæ,
Anonaceæ,	Onagraceæ,	Aristolochiaceæ,
Berberidaceæ,	Paronychiaceæ,	Amentaceæ,
Cruciferæ,	the Tribe Vicieæ,	Coniferæ,
Papaveraceæ,	the Tribe Cassieæ,	Cycadaceæ,
Violaceæ,	the Tribe Mimoseæ,	Alismaceæ,
Polygalaceæ,	Crassulaceæ,	(Musaceæ),
Pittosporaceæ,	Umbelliferæ,	Iridaceæ,
Caryophyllaceæ,	the Tribe Saxifrageæ,	Amaryllidaceæ,
Linaceæ,	Caprifoliaceæ,	Liliaceæ,
Bombaceæ,	Valerianaceæ,	Dioscoreaceæ,
Ternstroemiaceæ,	Sapotaceæ,	Smilaceæ,
(Olacaceæ),	(Ebenaceæ),	Commelinaceæ,
Aurantiaceæ,	Gentianaceæ,	Palmaceæ,
Hypericaceæ,	Bignoniaceæ,	Araceæ,
Meliaceæ,	Solanaceæ,	(Typhaceæ),
Ampelidaceæ,	Labiatæ,	Pistiaceæ,
Oxalidaceæ,	Verbenaceæ,	Juncaceæ,
Zygophyllaceæ,	Plantaginaceæ,	the genus Carex,
Rutaceæ,	Nyctaginaceæ,	the Tribe Agrostideæ,
Ochnaceæ,	Salsolaceæ,	Equisetaceæ.

On the 25th, the Vincennes sailed; and after a few hours, anchored in the principal harbor of the Island of AIMEO. Being of inferior size,

and only twelve miles distant, this island may be regarded as an appendage of Taheiti. It is irregularly oblong, indented, and somewhat crescent-shaped; with wilder scenery than around the coast portion of Taheiti; the highest of its sharp mountain-peaks being "three thousand feet" in elevation; and the jagged lofty connecting ridge, thin to the base, and even containing window-like apertures; two of which, large, lacerate, and admitting a view beyond, were in sight from the anchorage. Parts of two days were spent on shore; where I observed cellular lava to be abundant.

The strand being in great part margined with coral, presented some of the coral-island plants; in other situations, the vegetable growth proved the same as on Taheiti; the *Inocarpus*, however, being somewhat more frequent. High up on the mountain-ridge, were perpendicular cliffs exposed to the sun; differing in this respect from those on Taheiti; and containing in the crevices one or two species of plants that we did not meet with elsewhere.

The plants we found on Aimeo are included in the following List with those observed on Taheiti, but are separately specified:

(Stephania Fosteri, No. 1; recorded as) Cocculus?. A vine; the leaves peltate. Growing in open places in the mountain-forest.*

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* Unlike the inhabitants of any other country I have visited, the Taheitians have been accustomed to disseminate seeds and plants through the forest: so that well-known objects of cultivation occasionally make their appearance in the wildest and most secluded portions of the island.

Anona (squamosa?); the "custard apple." A shrub; oblong leaves. Cultivated; (having been introduced by trading and colonial Whites).

(Cardamine sarmentosa, No. 1; bis Metia). Growing in waste places near the coast; probably introduced.

(Brassica oleracea; cabbages seen in a garden. The plant introduced by trading and colonial Whites).

(——— rapa); the turnip. In one locality naturalized along a pathway, but the root probably of no value; (introduced by trading and colonial Whites).

Cleome (pentaphylla). One to two feet high; five-leaved; flowers white. In waste places; introduced (by trading and colonial Whites).

Hibiscus rosa-sinensis, (No 1). A beautiful tree, planted for ornament around the dwellings of the natives. (Introduced by aboriginal settlers; being) mentioned by Forster.

(Abelmoschus moschatus, No. 1; compare A. manihot). Herbaceous, three feet high; leaves five-lobed, pilose; outer calyx of eight linear segments; flowers large and ornamental; yellow, with a purple centre; fruit a follicle?. In open valleys between the mountain-ridges; (introduced by aboriginal settlers).

(Paritium) tiliaceum, (bis No. 1 Metia). Abundant; and seen also on Aimeo. Called "purau," and said to afford good timber, though of inferior size. The bark used for cordage.

(——— tricuspe, Roxb.). Not free from the suspicion of being a variety of the preceding, though the leaves differ so remarkably in being three-lobed. A few rather large trees growing in one or more localities on the sea-coast; the originals probably of Roxburgh's plant, which was brought to Calcutta "from the Society Islands." (We did not meet with P. tricuspe in any place subsequently visited by the Expedition).

Sida? (No. 3); but the carpels aristate. Suffruticose, one to two feet high; the flowers axillary, glomerate, small, and yellow. Within the shade of the Interior forest; frequent.

Nov. gen. procumbens, (bis No. 1 Metia); Triumfetta of Forster; capsule five-celled; the cells one-seeded. Maritime; seen only on Aimeo.

Commersonia echinata, (No. 1. Arborescent); six to twenty feet high. On mountain-ridges; as also in Aimeo.

Calophyllum (inophyllum; bis No. 1 Metia). Seen only in the vicinity of the sea-coast; called "ati," and the timber "valued for ship-building."

Gen. incert. Clusia-like, (No. 1). A spreading tree, forty feet high, having the habit of Clusia; opposite, coriaceous leaves. In the mountain-forest.

Dodonæa (bis No. 1 Metia). Growing on dry ridges near the sea-coast, and in some localities abundant.

Gen. incert. (No. 1). A large tree; leaves pinnate, 5-jugis cum impar.; flowers not seen. Frequent in the mountain-forest; called "apapi," and "used for large canoes."

Suriana; bis (No. 1 Paumotuan coral-islands). "On islet within the coral reef," Rich.

Xylosma suaveolens, Forst.? (compare No. 1 Metia). A shrub, having alternate, ovate, denticulate, Betuloid leaves; flowers dioecious; calyx 4-parted; no corolla; stamens numerous; a Celtis-like berry, with four seeds. In the mountain-forest; also seen on Aimeo.

Gossypium (religiosum?; No. 1), bis Metia. Naturalized near the coast; (having been introduced by aboriginal settlers. The wool white); the only use observed to be made of it, being for wicks in burning cocoa-nut oil; kept upright in the centre of the receptacle by means of two elastic slips.

Urena lobata, (No. 1, bis Metia). Everywhere an abundant weed; (introduced by aboriginal settlers).

Sida; bis (No. 2, Metia); habit of S. rhombifolia. Abundant; apparently introduced.

Citrus aurantium; the orange. Introduced (by trading and colonial Whites) since Cook's first visit; abundantly cultivated; seen also in remote situations in the Interior.

——— (acida). The so-called "citron," a thick-skinned variety of the lemon; agreeing in the acid pulp, but six or eight small rounded seeds in each cell; cultivated, and seen also on mountain-ridges in the Interior. The thin-skinned lemon also seen cultivated; this at least, having been introduced since Cook's first visit.

——— (limonum); the lime. Leaves crenate. Abundantly cultivated; introduced (by trading and colonial Whites) since Cook's first visit.

Cardiospermum (No. 1, bis Metia). Seen in wild situations; (introduced by aboriginal settlers).

Melia azedarach. Introduced, having been "raised from seed" by Rev. Mr. Wilson;

(Colubrina Asiatica; bis No. 1 Metia). A shrub, six feet high, with long, weak branches. Abundant in shady woods near the coast. Seen also on Aimeo.

Rhus (No. 1). A tree, thirty feet high; the berries small and black. Occupying, in scattered groves, tracts of the Interior forest.

Sophora littoralis? (No. 1); compare (No. 2) Brazil. The flowers yellow. Maritime. More abundant on Aimeo.

Desmodium (compare No. 1 Metia); pubescent; flowers in lax racemes; joints of the pod elongate.

Dolichos (No. 1); flowers yellow. Submaritime? Seen also on Aimeo.

Mucuna (No. 1). A vine; pod with oblique ridges, and the suture alate; seed large. In the Interior forest.

Inocarpus edulis, (No. 1). A tree; the trunk with projecting buttresses at base, continuous with the main roots; leaves having a sinus at base; flowers not seen. Abundant near the coast. Also seen on Aimeo.

Melastoma (Malabathricum, No. 1). A shrub, three to five feet high; setose; flowers white. On mountain-ridges.

(Astronia fraterna of Gray, No. 1; near) Melast. glabra of Forster. A shrub, five feet high; leaves trinerved, Cinnamomum-like, acuminate; flowers corymbose; calyx persistent, five-cleft; capsule five-celled, the cells many-seeded. On mountain-ridges.

Metrosideros (villosa, No. 1); flowers scarlet. A frequent shrub on mountain-ridges, to the elevation of four thousand feet. Also seen on Aimeo.

——— (diffusa, Dec.); entirely smooth; possibly a distinct species.

Myrtus? (No. 1). A shrub; fruit red, of the size of cherry. In the mountain-forest; rare.

Barringtonia speciosa, (bis No. 1 Metia). Frequent along the coast; and a single tree seen six miles inland.

Cucumis; bis (No. 1 Metia); flowers yellow; fruit smooth, and like a young water-melon, Frequent in open situations.

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the tree had attained the height of forty feet. Being requested to scatter some of the seeds in the Interior forest, I planted them in two lines in the form of a V.

(Vitis vinifera). Grapes said to have been successfully cultivated on the Southeastern part of the island, but we saw nothing of them.

Oxalis (repens?, No. 1); near O. corniculata; stem slightly hairy; leaflets obcordate. Frequent near the coast; introduced.

Spondias dulcis, (No. 1; bis Metia). A large tree, having the aspect of an oak, except that the trunk is continuous in a central stem to the summit; the fruit larger than in the Peruvian species, with firmer pulp, and something of the flavor of the mango. Frequent, both near the coast and in the Interior forest; but being deciduous, the leaves falling at the time of our visit, the tree did not seem really at home on Taheiti?. Met with also on Aimeo.

Tephrosia piscatoria, (No. 1, bis Metia). Naturalized. Seen also on Aimeo.

Indigofera; compare (No. 25) Peru. A shrub, five feet high; flowers red. Introduced (by trading and colonial Whites).

Crotalaria (verrucosa); leaves simple; flowers blue. Growing spontaneously, and frequent in some localities near the coast; (introduced by trading and colonial Whites).

Weinmannia parviflora, Forst. (No. 1). A shrub, or small tree, having the habit of a Cerasus; the leaves opposite and dentate, with an intermediate deciduous stipule; styles two, and the fruit bipartile. Frequent on mountain-ridges; as also in Aimeo.

Polyscias (No. 1). A shrub, eight to twelve feet high; leaves scattered, yet somewhat crowded, long-petioled, lanceolate; a terminal, crowded panicle; calyx of scales; six to eight stigmas; the fleshy fruit or berry, a third of an inch in diameter, five seeds counted. In the mountain-forest.

———?; compare the preceding. A shrub; leaves lanceolate, entire, eighteen inches in length. In the mountain-forest.

Arceuthobium (No. 1); leafless, with jointed stems. Parasitic on trees in the mountain-forest; frequent.

Loranthus (No. 1); tubular red flowers; leaves opposite, and twisted. Parasitic on a shrub, on the mountain ridge visited in Aimeo.

Gen. Mussændoid (No. 1); leaves penninerved, opposite, with a long, intermediate stipule; no flowers, nor colored floral leaves. In the mountain-forest.

Gen. Coffeac. (square-stemmed, No. 1). A shrub; the young twigs quadrangular; leaves opposite, inequal, lanceolate, entire; a terminal cyme; berry inferior, with two cells, many-seeded. In the mountain-forest.

Nauclea (No. 1); fr. in terminal capitul.; like Cephalanthus; leaves long-petioled; calyx five-cleft. Found by Mr. Brackenridge.

Chiococca barbata, Forst? (No. 1); leaves acuminate; tube of the corolla shorter than in Hooker's figure. Frequent in deep woods near the coast. Also seen on Aimeo.

Morinda? (No. 2). A shrub; leaves small, coriaceous, ovate, petioled; capitul. small; calyx four-cleft. On mountain-ridges.

Gen. Coffeoid triflora, (No. 1); Coffea of Forster. A shrub, six to eight feet high, presenting no peculiarity of aspect; leaves oblong, the petiole one and a half inches; berries two to three in a cluster, and two-seeded as in Coffea. In the mountain-forest.

Gen. Coffeac. (round-stipuled, No. 1); shining, dark-green leaves; the intermediate stipule roundish. A spreading tree, fifty feet high, with the trunk two and a half feet in diameter. In the Interior forest.

Gen. Helianthoid (No. 1). A spreading shrub, two to three feet high; leaves pubescent, opposite, petioled, serrate; involucre biserial, the outer scales longer and obtuse; ake-

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Desmodium (purpureum, No. 2; bis Metia); crowded pink flowers. Growing in an indigenous manner on dry ridges near the coast. Seen also on Aimeo.

Erythrina (No. 1). A spreading tree, forty feet high, with the trunk two and a half feet in diameter; corolla with the carina and alæ very short. Confined to the vicinity of the coast; and also seen on Aimeo. This and the Spondias, the only deciduous trees met with.

Cassia Occidentalis. A frequent weed; introduced (by trading and colonial Whites).

——— tora. More rare; introduced (by trading and colonial Whites). No specimens.

Abrus precatorius, (No. 1, bis Metia). Introduced (by aboriginal settlers).

Phaseolus (amoenus); near (No. 11) the Callao species. Large rose-colored flowers. Frequent near the coast; (introduced by aboriginal settlers).

Poinciana pulcherrima. Cultivated by the natives, as an ornamental plant.

Mimosa pudica. Introduced; a weed in cultivated ground.

nium biaristate; floret-rays short and yellow. On the mountain-ridge visited in Aimeo.

Lobelia (No. 1). Stems nearly simple, suffruticose, eight feet high; flowers greenish, large, with long laciniæ or segments. In the mountain-forest.

Vaccinium cereum, Forst. (No. 1). A shrub, two to five feet high. On mountain-ridges, from the elevation of one thousand feet to at least four thousand five hundred.

(Cyathodes No. 1); gen. Epacrid; flowers small; Empetrum-like berries, of different colors, white, red, and black. On mountain-ridges; as also in Aimeo.

Gen. Myrsin. (No. 1). Myricoid; leaves entire, coriaceous, with blackish specks; berries few, green with black lines. On the mountain-ridge visited in Aimeo.

Jasminum didymum, Vahl.? (No. 1). A woody vine; twin fruit.

(Alstonia? No. 1); gen. Amsonioid. Suffruticose; leaves penninerved, eight inches by three; flowers white, and rather small; fruit long, linear, and twisted. On mountain-ridges.

(———, No. 2); a second species. An upright shrub, six feet high; leaves opposite; flowers white; the twin fruit elongate. Also seen on Aimeo.

Alyxia (No. 1). A shrub; leaves ovate; berry single. On mountain-ridges. Also seen on Aimeo.

———? (No. 2). A woody vine; leaves opposite, entire; fruit like a small olive. On mountain-ridges.

(Labordia of Gaud.? No. 1). A shrub; leaves opposite, coriaceous, entire; calyx of five scales; flowers pale-orange, showy; corolla six-parted, the tube an inch and a half long; stamens six; style exserted, single, with two stigmas and two placentas. On mountains, both in Taheiti and Aimeo.

(Geniostoma?, No. 1). Prinos-like, but the leaves opposite, and also coriaceous and entire; cymes axillary; corolla 5-fid, hairy inside; stamens five; berry many-seeded. Among the specimens from Aimeo, but the locality not recollected.

Cyrtandra (No. 1). A shrub, eight to ten feet high; leaves long-petioled, penninerved, oblong, acute at each end; flowers white, large, deflexed. In the Interior forest.

(Serianthes myriadenia, No. 1); gen. Acacioid. Spoken of, and mistaken for the Tamarind. A large tree, growing in the woods on Aimeo; and young stocks, introduced on Taheiti. (Afterwards seen indigenous on the Feejee Islands).

(Vachellia) cavenia?, (compare No. 2 Chili); pod inflated. A single large shrub, growing near the coast; introduced (by trading and colonial Whites).

Inga Sinemariensis?; compare the pacai (No. 11 Peru). A single, small shrub, seen on Aimeo; introduced (by trading and colonial Whites).

Psidium (bis No. 4 Brazil and Peru); the guava. "Introduced some twelve years previously into Aimeo, and thence into Taheiti;" where it has gained possession of the lower and more fertile districts, so as to be spoken of as "having ruined the island." Rarely met with in the Interior.

Jambosa (No. 1); the Malay-apple. The fruit red, and devoid of aroma. In the mountain-forest; (introduced by aboriginal settlers).

Lagenaria vulgaris, (No. 1); the gourd. Cultivated; and the large hard-shelled fruit, the interior being removed, used for bottles; (the plant introduced by aboriginal settlers).

——— (No. 2); possibly distinct; the leaves crenate, and more ovate.

(Ipomoea) turpethum?; compare (No. 1) Metia; leaves cordate, or rather hastate, elongate; calyx and capsule inflated. On Aimeo.

(———) pes-capræ, (bis Brazil, and No. 2 Metia). In maritime sands; and more frequent on Aimeo.

(Rivea? No. 1); near Convolv. peltatus of Rumphius. A woody vine, having the stem sometimes two inches in diameter; leaves cordate and peltate; large white flowers. In woods along the coast, and also in the Interior.

Tournefortia (argentea; bis No. 1 Paumotuan coral-islands and Metia). Growing at "Papeita," Brackenridge.

(Premna; bis No. 1 Metia). A shrub, four to six feet high; leaves opposite, petioled, ovate, the margin undulately crenulate; the inflorescence cymose; calyx and corolla 4-fid; stamens four. On Aimeo, growing among Gleichenia.

Gen. Justicioid (No. 1). Suffruticose, four to six feet high; bracts roundish; stamens four. In the deep mountain-forest.

———; perhaps distinct; lax cymes; and no bracts. But the specimens far advanced or old.

Plumbago (No. 1). Near the sea-coast; rare.

Desmochæta (No. 1). A delicate, low herb; florets having a bur at base. Frequent in the deep mountain-forest.

Cassyta; bis (No. 1 Paumotuan coral-islands and Metia). Frequent on dry ridges near the coast.

Daphne (No. 1). Abounding on the ridges back of Papeita. Also seen on Aimeo.

Cucurbita; compare C. aurantia (No. 1), but the hard-shelled fruit seemed smaller. Called "aroro;" frequent throughout the mountain-forest, (and more or less scandent). Possibly indigenous.

——— (pepo; bis Chili, Peru, and No. 2 North America). The Peruvian variety of the pumpkin cultivated; having been introduced by trading and colonial Whites.

Carica papaya, (bis Metia and No. 1 Tropical America). Much cultivated; not mentioned by Forster, (and therefore, probably of recent introduction.) A germ-like body, sometimes arising from the end of the peduncle inside of the fruit.

Portulaca oleracea, (bis United States and Peru). In cultivated ground; introduced (by trading and colonial Whites).

Talinum patens, (bis No. 6 Brazil). A weed in cultivated ground; introduced (by trading and colonial Whites). Seen even around the solitary house in the centre of the island, on the route to Lake Waihiria; also on Aimeo.

(Gardenia Taitensis, No. 1; compare Otafuan coral-islands); calyx five-parted, twisted; corolla eight-cleft. A bushy shrub, with dense and beautiful foliage, cultivated by the natives.

Guettarda speciosa; bis (No. 1 Paumotuan) coral-islands. A single tree seen at the town of Papeita, evidently planted.

(Geophila reniformis, No. 1). A depressed, creeping herb; the berries red. In deep woods, growing as though indigenous.

Morinda citrifolia, (No. 1; bis Paumotuan coral-islands and Metia). Naturalized in various places.

Santalum (No. 1). "Sandal-wood formerly sold to traders; procured on the Interior mountain-ridges, by the aid of ropes and cutting artificial steps." Mr. Morenheit informed me, that "the natives could still furnish specimens; but it is no longer an article of commerce, and has become excessively rare." No direct evidence of its existence was met with by ourselves.

(Omalanthus?, No. 1). A low shrub, smooth in all its parts; with poplar-like leaves, broadly cuneate at base, the margin entire; fruit triangular. On mountain-ridges.

(Gen. Ricinoid, No. 1; compare R.? Tanarius). A shrub, ten feet high; leaves peltate, dentate. On mountain-ridges. Also seen in Aimeo.

Phyllanthus (virgata, Forst., No. 1). One to two feet high, but not fruticose; leaves mostly lanceolate. Frequent in dry situations, and elsewhere near the coast.

(Glochidium, No. 1; recorded as) Bradleja. A tree, thirty feet high, with the trunk a foot and a half in diameter; spreading, pendent branches; leaves inequal; calyx six-cleft. On dry ridges in the vicinity of the coast; also seen on Aimeo.

(——— No. 2); a second species. Habit of the preceding; but only a shrub, eighteen inches high; leaves equal. On the mountain-ridge visited in Aimeo.

(Euphorbia ramosissima, Hook.); bis (No. 1 Paumotuan) coral-islands. An intermediate stipule. On dry ridges near the coast.

Ascarina polystachya, Forst.? (No. 1). A shrub; leaves opposite, petioled, attenuate, crenate; long and branching aments; berry minute, one-seeded. In the mountain-forest.

Coffea Arabica. Cultivated; and said to succeed, even in the low valleys; (introduced by trading and colonial Whites).

(Adenostemma viscosum, No. 1); leaves opposite, Eupatorium-like; three or more short clavate pappus rays. On dry ridges, and in other situations near the coast. Also seen on Aimeo.

Bidens (compare No. 13 Chili and Peru.) Two to six feet high. In ravines, and other situations, frequent.

Sonchus oleraceus?, (compare United States, Patagonia, the Peruvian mountain-region, and No. 2 Europe). In waste places; introduced.

Siegesbeckia (No. 1, bis Metia). A frequent weed; (introduced by aboriginal settlers). Also seen on Aimeo.

(Myriogyne minuta, No. 1). A frequent weed in fertile ground; (introduced by aboriginal settlers).

Conyza? (No. 1). Resembling Cænotus Canadensis; upright, two to five feet high. Abounding on dry ridges near the coast; growing as though indigenous.

(Cerbera, No. 1). A tree, twenty feet high, with large white flowers. Cultivated for ornament by the natives.

(Batatas edulis, No. 1; bis the variety cultivated on Metia), differing from ours in the leaf, the smaller flowers, and the smaller and more fibrous roots; which, however, are of excellent quality. Perhaps the same species, growing spontaneously on dry ridges.

Cordia sebestena, (No. 1; compare Otafuan, Phœnix, and Wake's coral-islands). A spreading tree, thirty feet high. Apparently introduced, (of course by aboriginal settlers; being) already mentioned by Forster.

Elatostema pubescens, Forst. (No. 1). A low herb, with dentate leaves. Frequent in the deep shade of the Interior forest.

(Sciophila) lucida; bis (No. 1 Metia). Shrubby; leaves entirish, very slightly dent.; cym. long-peduncled. Growing about roots of trees, and in other situations. Also seen on Aimeo.

Ficus?; bis (No. 2) Metia. Perhaps distinct from the next species, the leaves larger, elongate, six inches long.

——— tinctoria, Forst; (compare Otafuan coral-islands). The under surface of the leaves rusty; fruit of the size of a small cherry, pedicelled.

———? (No. 3). The unknown tree, having the trunk composed of a congeries of roots. In the mountain-forest. No specimens.

Celtis (No. 1). A woody plant; leaves petioled, entire; styles two?. On the mountains.

Procris (No. 2); leaves alternate, ovate, elongate, white beneath. "Back of Papeita," Brackenridge.

Boehmeria (No. 1). A shrub; leaves almost trinerved, green on both sides; aments simple, nine inches long, glomerate. In the mountain-forest; also seen on Aimeo.

——— (No. 2). A shrub; large, smooth, long-petioled leaves; much branched aments, and small florets. Around Lake Waihiria.

——— (No. 3). A shrub; leaves broad-cordate, six inches wide, green on both sides; branching aments. In the mountain-forest.

——— (No. 4). A shrub; leaves cordate, four inches, pubescent, and glaucous beneath. In the mountain-forest.

——— (No. 5). A shrub; branching aments; leaves cuneate at base. In the mountain-forest.

Physalis, (possibly an American species); smooth. Introduced (by aboriginal settlers).

——— (compare No. 7 Chili and Peru); pubescent. Introduced (by aboriginal settlers).

Solanum (repandum, No. 1). Having the habit of S. melongena; fruit of the size of a small plum, tomentose. Naturalized, and seen in a wild situation; (but introduced by aboriginal settlers).

——— nigrum?, (compare Upper Egypt, and No. 28 California, Chili, and Peru). Valleys of the Interior, but introduced (by aboriginal settlers).

Nicotiana tabacum, (bis Metia, and No. 6 North America). Cultivated; (having been introduced by trading and colonial Whites).

Lindernia (No. 1). Not uncommon. (Introduced by aboriginal settlers).

Ocymum (sanctum?, No. 1). Naturalized and cultivated; (having been introduced by aboriginal settlers).

Leucas decem-dentatus, (No. 1; bis Metia); calyx with ten soft points or teeth; corolla bilabiate. Naturalized, (having been introduced by aboriginal settlers). Seen also on Aimeo.

Priva (lappulacea, bis No. 1 Brazil and Peru). Growing at "Papeita," Brackenridge. Introduced (by trading and colonial Whites).

Boerhaavia (procumbens?, No. 3; bis Metia); leaves glaucous beneath; flowers very small. Frequent in waste ground; introduced (by aboriginal settlers).

Achyranthes; compare (No. 2) Metia. The flowers greenish. No specimens.

Polygonum (No. 1; compare New Zealand, Australia, California, and Chili); resembling

Gen. Urticoid (No. 1). A shrub; leaves white beneath; flowers glomerate, axillary.

——— (No. 2); perhaps distinct; hairy.

Piper latifolium, Forst. (No. 1). A shrub, four to six feet high; leaves reniform, cordate, obtuse; berries red. Frequent in the Interior forest; also seen on Aimeo.

——— (No. 2); a second species. Leaves broad-cordate, pointed. A shrub of the same size with the preceding, equally frequent throughout the Interior forest, and clearly indigenous. Pointed out to me, as the plant used for making ava-drink; (but differs from the species cultivated for that purpose at the Samoa, Tonga, and Hawaiian Islands).

Peperomia; bis (No. 1 Metia). Epidendric; leaves simple, ovate, acute. Frequent in the Interior; also seen on Aimeo.

Gen. incert. (No. 2); perhaps a congener of (No. 1) Metia. A vine?; leaves sub-opposite, trifoliolate, entire; calyx monophyllous, four to five-cleft; fruit inferior?; the corolla not seen.

Gen. incert. (No. 1). A woody plant; leaves coriaceous, obovate, entire; flowers terminal, inconspicuous. In the mountain-forest.

Gen. Serapioid (No. 1; compare Calanthe veratrifolia?); flower-stem terminal. In the mountain-forest.

——— (No. 2); much larger than the preceding sp.; flower-stem lateral; capsule very large. In the mountain-forest.

(Microstylis?, No. 1); a congener of Malaxis unifolia. Near Malaxis liliifolia, but one-leaved; the leaf broad-cordate. In the mountain-forest.

Dendrobium biflorum, Forst.? (No. 1). Stems pendent, two to four feet long; leaf short, ovate; corolla with a short spur.

——— (No. 2). Two to three feet; linear grass-like leaves.

———? (No. 3). Stem eight inches long; leaves nine inches by two-thirds of an inch; flower-stems axillary; capsule much elongated.

P. mite and P. persicaria. Subaquatic around the margin of Lake Waihiria; apparently introduced, (of course by aboriginal settlers).

Aleurites triloba, (No. 1, bis Metia). A large tree; the leaves sometimes simple, in young plants often five-lobed. Seeming at home throughout the Interior forest, and perhaps really indigenous?; called "tutui," used in tattooing, and for other purposes.

Phyllanthus (niruri?). Very small leaves, and numerous flowers. Growing in waste places, and cultivated ground.

Euphorbia hypericifolia?, (compare United States, Peru, the East Indies, Hindostan, and Zanzibar). In waste ground; introduced (by trading and colonial Whites). No specimens.

Artocarpus incisa, (No. 1, bis Metia); the bread-fruit; having the seeds always abortive. Cultivated; but said to have diminished of late years; partly, perhaps, from being cut down for timber. The paste deposited in pits lined with a thick layer of leaves, is said to retain its goodness "for a twelve-month," and to be very substantial food; but it requires a cultivated palate; the peculiar flavor being compared by some of our party to that of "bee-bread." A single tree growing as far inland as the forks of Pupino Valley.

Morus alba, (bis United States, and No. 2 Northern Asia). Cultivated; (having been introduced by trading and colonial Whites).

Gen. Orchid. (No. 1), large-fruited. Leaf seven inches long, and an inch and a half wide, arising from an intervening bulb; capsule very large, an inch and a half long, deeply sulcate. Compare sp. seen on Aimeo.

(Gen. Maxillarioid? No. 1). Leaf nine inches long by half an inch wide, arising from an intervening bulb; scape radical; flowers rather small; a sack at base of corolla.

(Oberonia) equitans; bis (No. 1) Metia; Cymbidium of Forster. Compressed equitant leaves; inflorescence terminal; flowers small and green. Also seen on Aimeo.

———? (No. 2); compare D. Myosurus of Forster. Leaves eight inches long by a third of an inch wide; flower-stem axillary; flowers minute, green.

(Tacniophyllum) fasciola, (No. 1); Limodorum of Forster. Interesting in Vegetable physiology, from being reduced to a flower-stem and roots; the green upper surface of the roots themselves performing the function of leaves. Seen also on Aimeo. Figured by Mr. Drayton.

Dendrobioid, with cylindrical leaves, (No. 1). Pendulous, two to four feet long; leaves cylindrical and pointed, a fourth of an inch in diameter, and six inches in length.

Amomum (No. 1). Forming beds in openings in the mountain-forest.

Casuarina equisetifolia, (No. 1, bis Metia). A beautiful tree, (introduced by aboriginal settlers), and now forming groves in the vicinity of the coast.

Musa paradisica, (No. 1; bis Metia), and apparently the variety called "fig-banana" at Rio Janeiro. Abundantly cultivated in the vicinity of the coast; and once seen naturalized in the Interior, at one of the highest points visited. (Introduced by aboriginal settlers).

——— sp. nov., (No. 2); the "fehi." A well-marked species, having, instead of a compound, a simple floral-spike; which is always upright, with the fruit-pods arising singly from the central stem. Trunk purplish, with lines; the flowers not seen. The fruit differs remarkably from all varieties of the banana in its sensible properties; while unripe, rendered farinaceous by cooking; and when ripe, excellent in the crude state, the pulp approaching the consistence of soft butter, and brilliant yellow; the color being communicated to the urinary secretion. The fehi has taken possession of a large portion of the mountainous Interior of Taheiti; and in places difficult of access, forms shady groves, to the exclusion of all undergrowth; its tree-like trunk, though softly herbaceous, being twenty feet high, and nearly a foot in diameter. The plant being nowhere cultivated by the natives, seemed at first indigenous; but it does not produce seeds, extending itself solely by suckers that spring up at a distance from the parent stem; the banana was once seen intermingled; (and the species was afterwards met with under cultivation at the Samoan Islands). On the South or rainy side of Taheiti, the fehi was seen growing at the elevation of only five hundred feet above the sea; but on other parts of the island, nowhere below the limit of a thousand feet. A grove visited on the mountain-ridge in Aimeo.

Canna (Indica, bis Lower Peru and No. 1 Brazil). Flowers red. "Aimeo," Lieut. Wilkes Henry. Introduced (by trading and colonial Whites).

Curcuma (No. 1). A root having the taste of turmeric, frequent in some spots in the Interior; but there were neither flowers nor leaves.

Dracæna terminalis, (No. 1; bis Metia); the "ti." Naturalized in the wildest and most remote situations, and not seen under cultivation; the root has an agreeable flavor, and

Dianella? (No. 1). Fruit ovoid, superior. On mountain-ridges.

(Hamelinia? No. 1); compare Astelia of authors. Veratrum-like; leaves ribbed, white beneath; flower-stem lanate. On mountain-ridges.

Pandanus (bis No. 1 Paumotuan coral-islands and Metia). Growing near the sea-coast; but less abundant than on the coral-islands. Also seen on Aimeo. Young plants might be mistaken for an Eryngium.

Freycinetia (No. 1). An abundant shrub in the mountain-forest; sometimes sub-scandent. Also seen on Aimeo.

Gahnia schœnoides, Forst.? (No. 1); leaves an inch and a half broad. On mountain-ridges; rare.

Scleria? (No. 1). Having the habit of the preceding plant, and very large, three to five feet high; leaves three-fourths of an inch wide; flowers or florets numerous. Growing in large tufts on mountain-ridges; frequent.

Fimbristylis (No. 1). Having the habit of F. spadicea; long filiform leaves. In the mountain-forest; rare.

Gen. Scirpoid?; bis (No. 1) Manhii coral-island. West of Papeita, growing on islet within the coral reef.

Cynodon (dactylon, No. 1; bis Brazil and Lower Peru). In maritime sands; stem creeping.

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after much cooking, becomes farinaceous and esculent. (Introduced by aboriginal settlers); and we could not learn that any spirituous liquor had as yet been distilled from it.

Dioscorea (compare No. 1 Metia); leaves broadly cordate. Frequent in the woods.

——— (No. 2); a second species. Leaves sagittate or hastate, acuminate.—The yams brought on the table were of small size and excellent quality; but I did not ascertain the species.

(——— pentaphylla, No. 3). A Convolvulus-like five-leaved vine; the flowers not seen. Growing also on Aimeo.

Tacca (No. 1, bis Metia). Less frequent than on Metia; and not seen under cultivation.

(Colocasia) macrorhiza, (No. 1; bis Metia and coral-islands); the "ape." Naturalized; seen flowering in wild situations.

(——— antiquorum, No. 2; bis Metia and coral-islands); the "taro." A favorite esculent with the natives, but not very abundantly cultivated; naturalized in wild situations in the Interior.

Cocos nucifera, (bis Paumotuan coral-islands and Metia). In all instances, planted; continuing abundant in the low valleys near the coast, and sometimes growing on the nearest hills. Cocoa-nut oil manufactured by the natives, and scented with various fragrant plants.

Typha; near T. latifolia. A bed growing in a drowned marsh, between Matavai and Papeita; (but discordant, and probably introduced, either from Peru or perhaps New Zealand).

(Ananas, bis No. 1 Brazil); the pine apple. Introduced (by trading and colonial Whites) since Cook's first visit; cultivated; also seen naturalized in the wildest and most remote situations.

Kyllingia (monocephala, No. 1); capitul. white. (Introduced by aboriginal settlers).

Orthopogon (No. 1). Short, broad leaves. In the deep shade of the mountain-forest.

Lepturus (compare No. 1 Paumotuan coral-islands). Growing near the sea-coast.

Ischæmoid (No. 1). On dry ridges near the coast.

Gen. Poac. (No. 1). Leaves broad and short; florets apiculate. In the deep shade of the mountain-forest; frequent. Also seen on Aimeo.

Leptochloa (No. 1). Cespitose; some of the spikelets pedicelled. In clefts of rocks on Aimeo.

Psilotum (triquetrum; bis No. 1 Paumotuan coral-islands); upright. Also seen on Aimeo.

——— (complanatum; No. 2). Epidendric in the mountain-forest; pendulous; the extreme branches much compressed, wide; scales very sparse; fr. solitary, rare.

Lycopodium (No. 1). Epidendric in the mountain-forest; flowers axillary, or rather on furcate leaf, pedicelled.

——— (No. 2); near L. phlegmaria. Epidendric in the mountain-forest; leaves broad-lanceolate; terminal branching spikes.

——— (No. 3). Epidendric; scales long, densely imbricate; fr. axillary, dichotomously forked. In the mountain-forest.

——— (No. 4); a fourth species. Habit of L. clavatum. Intermingled with Gleichenia, on ridges near the coast.

Cyperus (No. 1), bis Metia. Large; the leaves glaucous beneath. Frequent; also seen on Aimeo.

Mariscus (paniceus, No. 1, bis Metia). Frequent.

Bambos, (No. 1). Naturalized, forming extensive beds in the mountain-forest; not seen in flower. (Introduced by aboriginal settlers).

Panicum (No. 1); hairy leaves. Ridges near the coast; frequent.

———; perhaps a second species; smoother.

Rhapis acicularis, (No. 1). Ridges near the coast; frequent. (Introduced by aboriginal settlers).

Cenchrus (calyculatus, No. 1, bis Metia). Frequent near the coast. Abundant also and troublesome on Aimeo. (Introduced by aboriginal settlers).

Paspalum; compare Metia, (No. 1). Short leaves.

——— (No. 2); a second species. Leaves broader than in sp. of Metia.

Digitaria, (compare No. 1 Paumotuan coral-islands and Metia); near D. paspalodes; sheaths hairy. Frequent on ridges near the coast.

———; possibly a second species. Smoother.

Saccharum officinarum, (No. 1, bis Metia); the sugar-cane. Cultivated, and also naturalized; forming tufts and beds in open situations in the wildest parts of the Interior; the stems, in general, diminutive and juiceless; but intermingled from the same root, an occasional large stem is produced, suitable for transplantation and cultivation. Withered panicles often met with, but there were no seeds. (Introduced by aboriginal settlers).

Eleusine Indica, (No. 1; bis Metia). Everywhere abundantly naturalized; having been introduced (by aboriginal settlers).

Marsilea (No. 1). The only aquatic plant; frequent in the pools and slow-moving streams of the cultivated district along the coast; (apparently indigenous, but perhaps introduced with taro culture).

——— (No. 5); a fifth species. Having the habit of the last, but more bifariously imbricate. Growing with Gleichenia, on mountain-ridges.

(Selaginella, No. 1). Lycopodium of authors; moss-like. On the ground in the deep mountain-forest.

Trichomanes (No. 1). Eight inches. Growing on trunks of trees in the deep mountain-forest.

Hymenophyllum (No. 1). Twelve inches; multifid. On trunks of trees in the deep mountain-forest.

Dicksonia (No. 1). Having the habit of our D. pilosiuscula, but the sori marginal.

——— (No. 2); a second species; congeneric, but the sori not marginal, and small.

——— (No. 3); a third species. Normal; three to five feet high; frond four times pinnatisect; fr. marginal. In the mountain-forest.

Nov. gen. Dicksonioid (No. 1); or compare Polypodium. Epidendric in the mountain-forest; fronds simply pinnate; fructification in marginal cups.

Vittaria (rigida, No. 1). Epidendric; pendulous in tufts, three inches to six feet long. Frequent.

Gen. incert. (No. 1). A tree-fern, thirty feet high; fronds much divided; indusium investing fructification.

Davallia (compare No. 1 Metia); resembling the Madeira species, but the fronds more divided. On trunks of trees, frequent.

——— (No. 2); seeming distinct; very small. On trunks of trees in the mountain-forest; rare.

(——— ? pectinata, Hook, No. 3; recorded as) Aspidium. Having a rhizoma, and the habit of Polypodium vulgare. Creeping on trunks of trees, in the mountain-forest and elsewhere.

Acrostichum (No. 1). Epidendric in the mountain-forest; simple, hairy, the fertile frond separate.

——— (aureum, No. 2; bis Brazil). Fronds simply pinnate, three to six feet high. Growing in large tufts in the marshes between Matavai and Papeita.

——— (No. 3). Having the habit of Asplenium. In the mountain-forest; and rarely seen in fruit.

Gen. Acrostichoid, (No. 1). Frond simple, lanceolate, smooth, glaucous beneath; the fructiferous portion terminal, partially detached, involute. On the Interior mountain-ridge traversed by the route to Lake Waihiria; rare.

Schizæa (dichotoma, No. 1); frond flabellately divided. On dry mountain-ridges; seen also on Aimeo.

Adiantum (No. 1). Two to three feet high; frond bipinnate. In the mountain-forest.

——— (No. 2). Among rocks in the mountains; also seen on Aimeo.

Lomaria? (No. 1); a congener of Chilian, sp.? In the mountain-forest, growing in large tufts, three to five feet high.

(Angiopteris evecta, No. 1; recorded as) Marattioid. A tree-fern; but the stout trunk, two feet in diameter, is only two or three feet high; the fronds, radiating all around to the distance in some instances of eighteen feet, are much subdivided. In the mountain-forest.

(——— No. 2; recorded as) Marattia; perhaps a second species. Herbaceous and small; margin of the frond minutely serrulate. Seen also on Aimeo.

Lygodium (scandens, No. 1). Twining around trees in the mountain-forest.

Blechnum (No. 1); near (No. 9) Brazil. Three to six feet high. Growing in woods near the coast.

Gleichenia (Hermanni, No. 1). Principally occupying the unwooded ridges near the coast. Also seen on Aimeo.

Cheilanthoid (No. 1). Three to eight inches high. On dry ridges, in clefts of rocks exposed to the sun; also seen on Aimeo.

Ophioglossum (pendulum, No. 1). Epidendric in the mountain-forest; fronds linear, pendulous, three to five feet long, and an inch wide; spike arising from the middle of the frond.

(Antrophyum plantagineum?, No. 1); Asplenioid. On trunks of trees; frond simple, lanceolate; fructification in long, irregular lines.

Gen. Polypod. (No. 1). Frond lanceolate, penninerved, the nervures undulate; sori large, no indusium?. Epidendric on trunks of trees, on the Interior mountain-ridge near Lake Waihiria.

"Niphobolus" (No. 1). Creeping on trunks of trees, and frequent; frond lanceolate-linear.

——— (No. 2); compare the preceding. Frond linear, seven inches long. Found by Mr. Brackenridge.

Polypodium; compare (No. 1 Paumotuan coral-islands and Metia); near P. aureum. Frequent on trunks of trees, and elsewhere.

——— (No. 2); seeming distinct; sori smaller; fronds three feet long. In the mountain-forest, rare.

——— (No. 3). Epidendric in the mountain-forest; frond lanceolate, pubescent, twelve to eighteen inches long; fruct. in two rows.

——— (No. 4). Small; frond pinnate, nine inches long. Epidendric on trunks of trees in the mountain-forest.

———; compare nov. gen. Dicksonioid (above described). Frond simply pinnate, eighteen inches long. On trunks of trees in the mountain-forest.

——— (No. 5); frond three to five feet, bipinnatisect. In the mountain-forest.

Gen. Polypodioid? (No. 1). A "tree-fern," according to Mr. Brackenridge; very large, hairy stipes; frond bipinnati.; sori small. In the mountain-forest.

Microsorus? (No. 1); frond lanceolate, two to three feet long. On trunks of trees in the mountain-forest.

———? (No. 2); frond three to five feet, bipinnatisect. In woods.

Polybotrya? (No. 1). Having the habit of Aspid. thelypteris; pinnis dentat.; fructification nearly covering the frond; marginal. Abounding in the marshes between Matavai and Papeita.

Pteris (No. 1); near P. aquilina. Bank of stream.

——— (No. 2); near P. pedata. In clefts of rocks exposed to the sun. Also seen on Aimeo.

———? (No. 3). Five feet high, spreading, with the frond bipinnatisect; but the segments sub-opposite, serrulate at the apex, linear-obtuse. In woods.

———?; compare the preceding. Very large, four to six feet high; the segments sometimes two to three inches.

(Nephrodium? No. 2). Having the habit of N. exaltatum; three to four feet high. Very abundant in woods.

(Thelypteris? No. 1); agreeing at least in habit. Two to three feet high. In the mountain-forest.

Diplazia (No. 1). Four to six feet high; frond tripinnatisect. Frequent in the Interior forest.

Asplenium nidus; bis (No. 1 Paumotuan) coral-islands and Metia. Frequent everywhere in woods, and chiefly epidendric; frond lanceolate.

——— (No. 2). Creeping; fruct. large, and few, situated towards the extremity of the lanceolate frond. In the mountain-forest.

——— (No. 3); frond multifid, tripinnatisect. In the mountain-forest.

———? (No. 4). Scandent and highly ornamental; fructification not seen. In shady woods.

——— (No. 5). Eight inches high; having the habit of A. marinum.

——— (No. 6). Three feet high; stipe hairy; frond pinnatisect, the segments acuminate, jagged. In the mountain-forest.

Marchantia (No. 1); fructif. peduncled.

——— (No. 2); fructif. sessile.

Jungermannia (No. 1).

Hypnum (No. 1); delicately plumose.

———? (No. 2); twining among branches, like Tillandsia usneoides. On the mountain-ridge near Lake Waihiria, and in other localities.

Gen. Musc. with large capsule, (No. 1). Stem branch.; capsule a fourth of an inch long. On the mountain-ridge near Lake Waihiria.

Polytrichum (No. 1); very small. On mountain-ridges, growing on the ground.—Mosses in general, were abundant and in much variety.

Parmelia (No. 2); grey. On the bark of trees.

——— (No. 3); dichotomously divided.

Usnea (No. 1). A fine species, frequent on branches of trees.

Cetraria? (No. 1). A fine species; large; branch.

Sticta (No. 1).

——— (No. 2); a second species; the upper surface white.

Cenomyce (No. 1); near C. pyxidata. On mountain-ridges, growing on the ground.

Ramalina (compare No. 1 Paumotuan coral-islands and Metia); very delicate, branching; Growing on branches of trees. Also seen on Aimeo.—Lichens, in general, were abundant and various.

Boletus (compare No. 1 Raraka coral-island); hard and almost woody. On trunks of trees.

Agaricus (No. 1).—Fungi in general were nowhere conspicuous, nor in much variety; but it should be observed, that very little attention was given by us to the Tribe.

The preceding List will be found to include less than two hundred indigenous species of Phænogamous plants and ferns. I was informed by Mr. Morenheit, that the collections made by the enterprising Bertero during his prolonged visit, "fell short of five hundred species:" deducting those that have been introduced, the number of species as yet observed indigenous on Taheiti, can hardly exceed four hundred. As the lofty central mountain remains unvisited, Taheiti may contain as many as eight hundred indigenous species: but to complete the flora, would be a serious undertaking; attended, independent of danger, with great exposure and fatigue.

c. Other Islands of the Taheitian Group.

Early in the morning of the 27th, the Vincennes sailed from Aimeo; continuing her course Westward. A little before sunset, "land" was announced from the mast-head, and was soon ascertained to be the Island of WAHEINI: undulating, and apparently of moderate elevation; but we saw it only in the distance, and were unable to distinguish any resemblance to a woman in outline, as might be inferred from the native name.

On the morning of the 28th, two high rocky islands were in sight: the nearest and largest being TAHAA. Farther on, we passed the much loftier BORABORA; a single mountain, rising very steeply out of the sea to the clouds, in which its summit was concealed.

A little to the Westward of Borabora, MOTU-ITI made its appearance; a low coral-island altogether similar to those already visited. Whether containing a lagoon, we could not ascertain, although we passed near enough to distinguish some very tall *cocoa-palms*.

In the absence of direct evidence it may be inferred, that the vegetable growth continues unchanged throughout the widely-scattered islands of the Society or Taheitian Group; and that these contain very few species of plants that do not grow on Taheiti; this being the main island.

2. THE TAHEITIAN MOUNTAIN-REGION.

The central mountain of Taheiti, above the limit of six thousand feet, must present a distinct botanical region; but its productions remain for the most part unknown.

After the departure of the Vincennes, Mr. Dana, following a different ridge, succeeded in reaching a more elevated spot than any visited by myself; and found growing there, a "remarkable plant belonging to the *Compositæ*." The specimen, being retained in the Peacock, did not come under my observation.

I have already mentioned: that the presence within the tropics of extra-tropical tribes of plants, seems sometimes due to the presence of mountains; although the species in question may not grow on mountain-summits. The mountainous character of Taheiti may there-

fore explain certain prominent Australian, or rather NEW ZEALAND ANALOGIES: as the presence on mountain-ridges of *Metrosideros*, of an *Epacrideous* shrub, of the Restio-like *Gahnia*, and of a *Weinmannia*.

On the other hand, a *Vaccinium*, that extends as low down as a thousand feet from the level of the sea, deserves especial notice; as belonging not to an Austral, but a BOREAL tribe.

3. THE SAMOAN ISLAND-REGION.

Leaving Motu-iti, in the Taheitian Group, the Vincennes continued Westward through a wide tract of ocean, interrupted only by two small coral-islands, already noticed: Bellinghausen coral-island, visited by us on the 30th, the second day out; and Rose coral-island, which we left in the evening of the 7th of October.

On the 8th, we arrived in sight of MANUA; the nearest of several high rocky islands, that succeed each other in a line running East and West "two hundred and two miles;" and called the Samoan or Navigator Group.

Manua, the smallest of the four principal islands, seemed little else than a single mountain, rising on all sides somewhat steeply out of the sea; the central summit concealed in the clouds, but perhaps not exceeding two thousand feet in elevation. The island seemed luxuriant, or even clothed with a forest; great numbers of *cocoa-palms* being also in sight. At the Southern end, the prolonged ridges became more broken, and even in some places torn and precipitous; the coast beyond being very slightly indented, presenting a rather distinct cove. On the 9th, I landed with others in this cove; and in the course of two and a half hours on shore, ascended the neighboring ridge, three hundred feet or so in elevation; the path leading up the face of precipices, by means of artificial niches, cut in the rock to afford foot-hold. The rock everywhere proved a *conglomerate;* the included pebbles, in some instances, being decidedly angular. A few detached fragments of cellular lava, apparently from some other part of the island, were lying on the top of the ridge. In sailing past, the rock, as seen from the ship, presented some appearances of stratification; the layers keeping a general horizontal direction in the cliffs of the coast, but much undulated, and at one or more points contorted.

About "five miles" beyond Manua, two mountain-lumps rose out of the sea; and were found to be connected by a coral reef, so as to form a double islet; called by the natives ULASINGA and OFU. The Vincennes passing near, marks of stratification again became distinguishable with the glass; the layers now inclined, and in one place meeting at an angle, or plicate. Open-mouthed caves occurred at the level of the ocean, evidently not formed by the action of surf; but like similar ones afterwards seen around Tutuila, original in the volcanic rock.

Manua with Ulasinga and Ofu, are separated from the remainder of the group by an interval of some sixty miles; but in clear weather, the next island, Tutuila, is within the range of vision. The interval has proved insufficient for any change in the vegetable growth.

On the 10th, I parted from Mr. Brackenridge; and went on board the Porpoise, for the remainder of our stay at the Samoan Islands.

On the 11th, the Porpoise passed TUTUILA; next to Manua in size, being only about three times as large; narrow in shape, and somewhat elbowed, with mountain-ridges and peaks, the highest being "twenty-three hundred and twenty-seven feet" in elevation. Tutuila contains the fine harbor of Pango Pango; visited some days later; and on the shores of which, I met with much cellular *lava*, intermixed with *conglomerate* and other varieties of sedimentary rock, all more or less altered by heat.

On the 12th, in approaching and sailing along UPOLU, we had a fine view of this large island, and of the lofty broad-swelling mountain-ridge, that occupies its whole length. On the 13th, the Porpoise turned towards the land, and entered the harbor of Apia. I landed with others, and walked by the regular path about a mile and a half inland to a small village; returning in time for short excursions on either hand along the sea-beach. The vegetable growth was much richer and more varied than at Taheiti; as was at once perceived, by the numerous kinds of forest-trees. The geological structure, judging from scattered blocks or boulders, seemed the same as that of Manua and Tutuila.

Beyond Upolu, we passed the islet of MANONO. And a little farther on, APULIMA; an islet influencing the political history of the Samoans, from being a stronghold; "accessible only in one place."

On the 15th, the Porpoise arrived off SAVAII; the largest and loftiest island of the group; being "a hundred geographical miles in circuit, and twice as large as Taheiti." Its broad, central summit, probably

exceeding four thousand feet in elevation, is almost constantly concealed in the clouds; and only once during our prolonged stay became visible. The superior elevation would not at first be suspected; the land rising all around in an exceedingly gentle regular slope, its evenness interrupted only by occasional knob-like hillocks. On landing, the peculiar topographical features were explained; the island being covered with *lava-streams*, that had flowed downwards and outwards from the central summit; there were no ridges, nor ravines; nor even streams of running water; the profuse rains sinking into the porous lava, to reappear in copious springs all around the island, just above the tide. In all my excursions during nine days on shore, cellular lava was the only kind of rock met with: but towards the North point of the island, I visited a more recent lava-stream, wide-spreading, known to the natives as the "Mu," and distinguishable by the more flattened surface and more distinct concentric folds left in the rock in cooling. This lava-stream proved old enough to be overgrown with large trees; and there did not appear to be any tradition of its eruption; but *earthquakes* were spoken of, as not rare.

On the 24th, Capt. Ringgold, in the Porpoise, completed the circumnavigation of the island; and in the evening, I returned on board.

On the 25th, the Porpoise left Savaii, returning Eastward. We sailed near Apulima; and next, along the South side of Upolu; and on the 29th, entered the harbor of Pango Pango in Tutuila.

On the 9th of November, the Porpoise left Tutuila, sailing Westward; and at sunrise on the 10th, arrived at Apia, where I rejoined the Vincennes. Instead of again landing at Apia, I visited Mr. Rich in the Peacock, and looked over his collections; this being the last day of our stay at the Samoan Islands.

Climate. The climate proved to be the most rainy I ever experienced. The superior humidity is shown by the universal rankness in the vegetable growth; (and is impressed even on our prepared specimens; which, though not all collected in the rain, can to this day be identified by the discoloration).

I kept no journal of the weather; but my memoranda contain incidentally the following notices:

Oct. 10th; approaching Tutuila; calm during the day, with rain.
11th; in the Porpoise, off Tutuila; calm all the preceding night and most of this day, but some squalls with heavy rain.
12th; approaching and off Upolu; mostly calm.

Oct. 13th; off Apia in Upolu; the wind very high during the preceding night, somewhat abated this morning; after a few hours nearly calm, so that we could safely enter the harbor.

14th; sailed early, but the wind so light, that we were unable to reach Savaii.

15th; the Porpoise (as I learned subsequently) at one time "in danger of drifting on the reef, during a calm."

16th; on Savaii, in the Interior forest; 4 P.M., raining.

17th; on Savaii, in the Interior forest; raining heavily. I did not suspect, that there was at the time a "gale on the coast;" both at Sapapali, and experienced "by the Porpoise off the South side of Savaii."

23d; on Savaii, six miles South of Sapapali; proceeded no farther on account of the rain, and returned in the afternoon.

24th; leaving Savaii; on our way in the evening to the Porpoise, the boat encountered a heavy fall of rain.

26th; in the Porpoise, off the South side of Upolu; calm at noon.

27th; in the Porpoise, off the South side of Upolu; squally with rain; a whirlwind said to have passed near the vessel; much rain during the afternoon, and the succeeding night.

28th; a fine morning. The wind, during a part of the day, blowing rather fresh.

29th; Pango Pango Harbor, in Tutuila; stormy most of the day.

30th; rainy most of the day.

31st to Nov. 4th; mostly fine weather; but Nov. 2d was oppressively warm, the temperature being "91° Fahr. in the Porpoise." A West wind immediately followed, blowing steadily for two days.

Nov. 5th; in the evening, an Easterly gale commenced.

6th to 8th; the gale continuing.

9th; in the afternoon, the gale having somewhat abated, the Porpoise sailed, beating out of the harbor, with the prospect of a rapid passage to Apia.

It will thus be perceived, that we experienced throughout much bad weather; high winds, calms, frequent and long-continued rains. These were besides, occasionally attended with a little thunder and lighting. We were told, that the most violent gales "come from the Westward;" and that a few years previously, "most of the bread-fruit trees on Savaii were destroyed by a hurricane."

In regard to the subterranean or mean annual temperature, Dr. Fox was unable to obtain satisfactory observations; and his result, "74° Fahr. at Tutuila, and 72° at Apia," is doubtless, in both instances, too low.

Seasons are recognized; and we were informed, that we had arrived in "the cool season." Yet in the intervals between the rains, we found the weather sometimes very warm, as above intimated.

So far as seasons are marked by the flowering of plants, there was a difference from Taheiti, that did not seem explicable: *bread-fruit* was

very scarce and "out of season there;" but after only eleven days, proved abundant at the Samoan Islands, where "the bread-fruit season had commenced;" something similar was remarked by others respecting the *vi-plum* (Spondias), but with me this fruit was rare; the *Inocarpus*, too, was in flower, whereas no signs of flowers could be discovered at Taheiti.

The general vegetable growth. With the exception of the "savannas" or natural openings, said to occur on Upolu, these islands, from the mountain-tops to the sea, were covered originally with a dense forest of large trees; and such is the universal luxuriance, that much of the original forest-aspect continues throughout the clearings; all of them more or less neglected.

Manua, Tutuila, and Upolu, consisting of mountain-ridges rising directly out of the sea, present differences in soil and exposure; and are more favorable to variety in productions than Savaii. With more sunlight, there was a more frequent evolution of flowers: the *climbing Freycinetia*, everywhere abundant, presented no signs of flowering on Savaii; while on Tutuila, its ornamental, orange-colored floral-leaves were in all directions conspicuous; *epidendric Orchidaceæ* being at the same time more various and abundant.

Of large and medium-sized trees: *Barringtonia speciosa*, *Calophyllum inophyllum*, and here first making their appearance *Thespesia populnea* and *Hernandia sonora*, were all submaritime and confined to the sea-shore.—Of species growing inland on Manua, Tutuila, Upolu, and in the marginal district of Savaii, the following may be enumerated as frequent: *Inocarpus edulis*, of large dimensions, and perhaps the most abundant tree, but not extending far from the sea; *Kleinhovia*, fifty to seventy feet high, with the trunk rather straight, and Tilia-like foliage, especially frequent on Upolu; *gen. Tiliac.*, similar in habit, but usually of smaller dimensions; various medium-sized species of *Ficus*, the lofty false "banyan-tree" being rare; *gen. Geoffræoid?* a medium-sized tree, with simple leaves resembling those of Inocarpus; *gen. Terebinthac.?*, a large tree, with long, pinnate, and softly-pubescent leaves; a pinnate-leaved *gen. Terebinth.?*, with ferruginous scurfy twigs; a *Rhus*, in certain situations frequent, and often forty feet high; a *gen. incert.* with pinnate, pubescent stipuled leaves; and a pinnate-leaved *Sapindoid*, seen by Mr. Brackenridge "forty feet" high.

Of true *parasitic plants*, coming out of the branches of trees, I met with only a species of *Loranthus;* remarkable for having stems and

branches of unusual length, spreading outwards ten or twelve feet in every direction, so as to be sometimes mistaken in the forest for a tree-top.—*Epidendric plants* were in great variety and luxuriance: especially *Ferns*, very generally differing from the Taheitian species; as also the epidendric *Orchidaceæ*, which, though not abundant, were in greater variety than at Taheiti, and chiefly occurred in situations exposed to the sun, often even on cultivated trees in the clearings; a *Peperomia* was everywhere frequent on the trunks and branches of trees.

The trunks of the trees, were besides conspicuously invested with certain vine-like plants; as the *scandent Freycinetia* already mentioned, and two or three species of *Pothos*.

On the other hand, the woods, especially on Savaii, presented in the distance a peculiar stringy aspect, from the profusion of tall-climbing *vines:* as *Convolvuli* of various species; *Dioscoreas;* a *gen. Cynanchoid;* two or three *Hoyas;* a *Mucuna*, overspreading the tallest trees; and other vines of various affinity, some woody-stemmed, and others herbaceous.

Of trees below the medium size, the following may be enumerated as frequent: a *Diospyros;* two species of *Myristica*, or wild nutmeg, presenting no marked peculiarity of aspect, although the branches are given out in whorls at regular intervals, as in young spruces; a *Nauclea*, sometimes thirty feet high, with the trunk eighteen inches in diameter; a *Celtis?*, becoming a long-branched tree; two *Procris-like* trees; and on mountain-ridges, a *Maba*, *Glochidium*, *gen. Myrtac.* with corymbose flowers, and *gen. Ceanothoid*, all four frequent.

Among the more frequent shrubs, many of them arborescent, the following may be enumerated: three or four species of *Alyxia;* various *Coffeaceæ*, including a congener of the Taheitian C. triflora; one or more shrubby *Urticeæ;* a *Dendrolobium* or arborescent Desmodium, sometimes twenty feet high; a dicoccous *Omalanthus?*, eight to twelve feet high, abounding on Manua and Tutuila; *Ricinus? Tanarius*, thick-stemmed and subherbaceous, though ten to twenty feet high; *Barringtonia racemosa*, a large, weak-stemmed shrub, remarkable for its very long, pendulous racemes; *Melastoma Malabathrica*, as on Taheiti; *Cordia? aspera*, ten to fifteen feet high, with inconspicuous flowers; various species of *Cyrtandra;* a *Mœsa?*, abundant; a *Daphne*, and three other *Thymeleaceous* shrubs, one of them arborescent; *Premna*, frequent in the vicinity of the sea; a *Clerodendron*, four to six feet high,

abundant; *gen. Araliac.*, six to twelve feet high, with long, pinnate, and jointed leaves; some *Myrtaceæ*, growing near the coast; a *Cestrum-like* shrub, six to twelve feet high, and abundant; a *Geniostoma*, eight feet high; *gen. Acronychioid*, more or less arborescent; and, on mountain-ridges, *gen. Simarub.?*, ten to twenty feet high.

Tree-ferns were less abundant and less prominent than at Taheiti, being overtopped in a closer forest of large trees; yet two or three species were observed to be frequent. Throughout the forest and all over the islands, a profusion of other kinds of *Ferns* were intermingled with the shrubs growing on the ground, many of the species being of large size.

The forest of Interior Savaii. The island, with all its inequalities of surface and original botanical localities, having been buried under lava streams, the plants now growing on Savaii are in new soil, of a uniform character throughout; with hardly any variation in situation and exposure.

The climate in Interior Savaii differs from that of the remaining portion of the group, being yet more humid. So profuse have been the rains, that the lava-crust with vegetable admixture, has been very generally decomposed into soil, and has become covered with a heavy forest. Of the component trees, some proved the same as those already mentioned, only larger and loftier; but there were other frequent trees, that I did not meet with elsewhere.

After passing neglected clearings, and entering the border of this forest, a *Musaceous* plant formed a frequent and striking object; distinguished from the banana by its leaves, instead of spreading, standing upright. Farther in, were fine, luxuriant *tree-ferns;* and among them, the tallest I ever met with, growing in one instance fifty feet high; while throughout the forest to the limit of my excursion, the Polynesian *bamboo* seemed at home, and could only be regarded as indigenous.

The undergrowth being neither very dense nor much entangled, I was enabled to proceed about eight miles from the sea; the only serious obstacle being the continual rain; but my time was limited; and the central portion of the island remained "unvisited, even by the natives." Unknown flowers and fruits were strewed upon the ground, while the lofty trees, with every leaf beyond the scan of ordinary vision, appeared often to exceed a hundred feet in height. A peltate-leaved *Cupanioid?*, wide-spreading and eighty feet high, together with

an *Omalanthus?* full as lofty, entered largely into the composition of the forest; a tree, *Terminalioid* in its habit of growth, but the leaves serrulate, was also abundant; a *gen. Sapot.*, having Aegiceras-like fruit, was met with occasionally; also a lanceolate-leaved *Calophyllum;* an *Uvaria* seventy feet high; and what surprised me, at this distance from the coast, trees of *Paritium tiliaceum*, intermingled singly and hardly inferior in dimensions, certainly not less than sixty feet high.

The above is but an imperfect list of the component trees: which seemed as lofty as those of the primeval forest of Brazil, with more shade, and the same upward tendency of the branches, carrying all the foliage to a distance; but in place of enlivening gaudy flowers, either on the tree-tops or anywhere in the forest, the few flowers present were either white, or inclining more or less to greenish. Everywhere, the peculiarly Samoan tendency to the peltate form of leaf or umbrella-like foliage, was abundantly manifest.

From descriptions in books, I had been accustomed to regard the *Flagellaria* as only a reedy plant; and was therefore astonished to see the tallest forest-trees mantled, and even covered up by a single stock. A *climbing Piper* in like manner overspread other tree-tops; and even the *climbing Freycinetia*, so profusely enveloping the trunks, sometimes ascended to the extreme branches. I could discover no epidendric Orchidaceæ in the deep forest, and if present, they must have been out of sight in the tree-tops; but on the dripping trunks, among other investing plants, an *herbaceous Cyrtandroid* was observed to be fairly epidendric.

Among the signs of increased luxuriance and productiveness, *palms* make their appearance: a tall *Areca*, seventy to eighty feet high, growing on a distant hillock, and differing from the cocoa-palm by its hemispherical summit, the lower fronds extending, instead of downwards, horizontally outwards.

Beneath the large forest-trees, were scattered trees of only medium size; as, different species of *Ficus*, and the two *Myristicas* already noticed; also, young stocks of the large forest-trees in every stage of development.—A set of woody plants was also intermingled, that can hardly be regarded as either shrubs or trees; the stem being extremely slender and perfectly upright, and at the height of twenty-five or thirty feet, crowned with a tuft of very large leaves, radiating in some instances to the distance of three feet all around: or if there are branches, these keep upright and closely parallel, and in like

manner are crowned with a terminal tuft of large leaves. Some examples of this mode of growth occurred in the Brazilian forest; faintly foreshadowing the display now presented in all directions, by a *Polyscias*, a *gen. Elatostemoid*, a long-stipuled *Coffeac.*, and a very remarkable *Morindoid Coffeac.*, with large pendent capitula of almost Crinum-like flowers.—Normal shrubs were not abundant: but one or more species of *Piper* were met with, together with various *Coffeaceæ*, and two or three remarkable *Cyrtandras;* all, when full-grown, seldom less than ten feet high, as though under an enlarged standard of development. The intervals between the stems of shrubs and trees, being occupied by large *Ferns*, in great variety and luxuriance.

Beneath, in the intervals between the tufts of large ferns, a few humble and tenderly herbaceous plants were occasionally met with: as, three or four *Elatostemas;* and especially, a variety of *ground Orchidaceæ*, having greenish, and for the most part, inconspicuous flowers; but the etioled *gen. Orchidac.*, devoid in all parts of the slightest tinge of green, so as to be adapted to the deepest shade, was met with only on the other islands of the group.—Again, in the deep shade beneath the large ferns, the general growth of diminutive Cryptogamous plants was unusually luxuriant, and even comparatively gigantic: consisting of a *Hymenophyllum*, eighteen inches high; a *Trichomanes*, a foot high, everywhere abundant; a second large *Trichomanes*, abundantly intermingled, and distinguished by its fascicled stems; a hypnoid *Lycopodium*, one to two feet high; and a Trichomanes-like *Asplenioid.:* but humble species of *Trichomanes* were also present; together with a profusion of *Hepaticæ* and *Mosses*, as in other portions of the Samoan forest; a *Hypnum?* rambling, Tillandsia-like, among the branches of shrubs; and *Jungermannias*, in moist situations overrunning living leaves. Some fine *Lichens*, nowhere abundant, were interspersed; and large-sized *Fungi* were observed to be both frequent and in very considerable variety.

Mountain-crests. The only mountain-ridges I had the opportunity of visiting, were on Tutuila; the highest peak there being only "twenty-three hundred and twenty-seven feet" above the sea. On one of my excursions, I approached within a fourth of a mile, and three hundred feet vertically, of this highest point; and much to my surprise, found the surface occupied in great part by a *Pandanus*, perhaps a peculiar species; a decumbent *Freycinetia* also abounded; two

plants greatly impeding progress, and as evening was approaching, I decided to proceed no farther. All the way to the summit, the vegetable growth continuing in sight was clearly the same with that around me: the matted bed of *Pandanus* and *Freycinetia* covering the exposed crest; while on the descending slopes, shrubs and low trees were intermingled, many of them species not growing in the country below: as, a scarlet-flowered *Metrosideros*, a spreading tree, thirty feet high; a *Myrtus?* with sessile, cherry-like fruit; an Ilex-like *Acronychia?*; a *Melastomac.* with white and singularly wax-like petals; an *Alstonia*; an *Eurya?*, a shrub with inconspicuous flowers; a *Weinmannia*; a peculiar species of *Geniostoma*; a Myrica-like *Myrsine*; the *Grossostylis*, having much of the aspect of Philadelphus; and a large flowered *Cyrtandra*: also peculiar *epidendric Orchidaceæ*; the resemblance to the Taheitian mountain-ridges being further kept up by a few beds of *Gleichenia*, the only ones I met with on the Samoan Islands.

Character and composition of the vegetable growth. The Order of frequency was essentially the same as on Taheiti; but *Coffeaceæ* and *Orchidaceæ* having become more abundant, were now among the prevailing Families; which may, therefore, be enumerated as follows:

1. *Filices*, or ferns. Holding the first place in frequency, as on Taheiti.

2. *Urticaceæ*. Next in frequency, as on Taheiti.

3. *Coffeaceæ*. Holding the third place, as on Taheiti; but now in greater profusion, with a greater variety of genera and species.

4. *Orchidaceæ*. More frequent than on Taheiti, from the numerous ground species, and presenting a greater variety of genera.

Next in order after the above four, the following Families were exceedingly frequent: *Myrtaceæ*; *Euphorbiaceæ*; *Cyrtandraceæ*; *Pandanaceæ*, from the profusion everywhere of *Freycinetia*; *Piperaceæ*; *Convolvulaceæ*; and *Apocynaceæ*: to which may even be added, *Cucurbitaceæ* and *Terebinthaceæ*.

The character of the vegetable growth proved to be Polynesian: many of the tribes first seen on Metia and Taheiti continuing; as, *Commersonia*, *Inocarpus*, *Polyscias*, *Alyxia*, *Geniostoma*, *Labordia*, *Cyrtandra*, *Elatostema* and *Sciophila*, *Tæniophyllum*, and *Freycinetia*; while among the Polynesian tribes now making their first appearance, were *gen. Simarub.?*, *Acronychia*, *Grossostylis*, *nov. gen. Musac.*, and others.

The vegetable growth, being richer than on Taheiti, with the number of species doubled and a much greater variety of forest-trees, many additional tribes of plants made their appearance: as *Anonaceæ* in Uvaria, *Thespesia*, *Sterculiaceæ*, *Ternstroemiaceæ*, *Olacaceæ*, *Aurantiaceæ* in Micromelum, *Ampelidaceæ*, *Rhizophoraceæ*, *Combretaceæ*, normal *Araliaceæ*, *Ebenaceæ*, *Solanaceæ*, *Verbenaceæ*, *Scrophulariaceæ*, Dais-like *Thymeleæ*, *Aristolochiaceæ*, *Antidesmeæ*, *Musaceæ*, *Dioscoreaceæ*, *Palmaceæ*, *Araceæ*, and others.

In accordance with the geographical position, it will be perceived, that many of the additional tribes making their appearance are East Indian rather than Polynesian: as, *Uvaria*, *Kleinhovia*, *Micromelum*, *Dendrolobium*, *Canavalia*, *Terminalia*, *Mœsa*, *Hoya*, *Myristica*, *Hernandia*, *Epicarpurus*, *Flagellaria*, and *Bambos*.

In view of the constant humidity; the vegetable growth consisting principally of shrubs and trees, many of them bearing large and even giant leaves, with the peltate form singularly frequent; this would seem to be the country of all others, in strongest contrast with Australia. I was, therefore, surprised at meeting with a *phyllodia-bearing Acacia*, growing along the sea-coast; but on examination, the foliage partook of the Samoan rather than the Australian character, the phyllodia being broad-elliptic, and almost tenderly-herbaceous. It would seem impossible for Samoa to produce diminutive-leaved, delicate, slender-stemmed plants, like those that fill Australia.

There are, however, mountains on the Samoan Islands; though not sufficiently elevated for a distinct mountain-region: and on comparing the lofty Polynesian Groups, we note the absence of Lobeliaceæ, Melanthaceæ, Vacciniaceæ, and Epacridaceæ. The Samoan mountain-crests afford, however, New Zealand analogies: in the presence of *Metrosideros* and *Weinmannia*.

Negative characters. Many species of *Compositæ* root in wet ground; and many have no feathery pappus to bear their seeds through the air; yet in general, Compositæ become rare in rainy climates. They seem altogether absent from the indigenous growth on the Samoan Islands.

Grasses continued extremely rare; but *Cyperaceæ*, though rare, were in somewhat more variety than on Taheiti; the principal change was in *Urticeous shrubs*, which had become decidedly rarer.

The negative characters continue throughout much as on Taheiti; as will appear by comparing the following List of missing Tribes:

Ranunculaceæ,
Magnoliaceæ,
Berberidaceæ,
Papaveraceæ,
Cruciferæ,
Violaceæ,
Polygalaceæ,
Caryophyllaceæ,
Linaceæ,
Bombaceæ,
Hypericaceæ,
Oxalidaceæ,
Zygophyllaceæ,
(Ochnaceæ),
Pittosporaceæ,
the tribe Vicieæ,
Rosaceæ,
Onagraceæ,
Paronychiaceæ,
Crassulaceæ,
the tribe Saxifrageæ,
(Umbelliferæ),
Caprifoliaceæ,
Valerianaceæ,
Compositæ?,
(the tribe Lobelieæ),
Vacciniaceæ,
Epacridaceæ,
Gentianaceæ,
Bignoniaceæ,
Labiatæ?,
Myoporaceæ,
Plumbaginaceæ,
Nyctaginaceæ?,
Plantaginaceæ,
Salsolaceæ,
Polygonaceæ,
Lauraceæ,
Amentaceæ,
Coniferæ,
Cycadaceæ,
Alismaceæ,
Iridaceæ,
Liliaceæ,
Melanthaceæ,
Smilaceæ,
(Commelinaceæ),
Typhaceæ,
the tribe Agrostideæ,
Equisetaceæ.

In regard to the plants given below, it should be observed: That I was separated from Mr. Brackenridge after leaving Manua; that of the species credited to Upolu, very few were seen there by myself; and that neither Mr. Rich nor Mr. Brackenridge landed on Savaii. The collections, however, were all reviewed by myself, and are included in the following List:

(Euryandra? No. 1). Gen. incert.; resembling a Leguminous plant, but the pods arise four together, and have no suture above; the seeds large, and transverse. An ornamental, woody vine; the leaves simple, entire, subcordate at base; peduncle long, and woody. Manua, and elsewhere.*

Uvaria, (No. 1). A tree, sixty to seventy feet high; leaves short-petioled, subcordate at base. Savaii; the timber valued by the natives.

(Stephania); compare Cocculus? (No. 1) Taheiti. No flowers. Upolu.

Thespesia populnea, (No. 1; see Tarawan coral-islands). A tree of medium size; outer calyx caducous, and three-leaved. Frequent along the sea-coast.

(Paritium) tiliaceum, (bis No. 1 Metia and Taheiti, and compare Brazil); the involucre persistent. A small tree, intermingled singly with the preceding on Tutuila, Upolu, and Savaii.—Apparently the same species in the forest of Interior Savaii, growing sixty

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*Anona (bis Taheiti); the "custard-apple." A young plant seen growing, "brought by the missionaries from the Society Islands."

Cardamine? sarmentosa, (No. 1, bis Metia and Taheiti). Frequent in waste ground on Manua, Tutuila, and Savaii; introduced (by aboriginal settlers).

Gossypium (religiosum? No. 1, bis Metia and Taheiti). Naturalized on Savaii; (having been introduced by aboriginal settlers).

feet high; the leaves roundish-cordate, acuminate, with a very deep sinus, and close white tomentum on the under surface; pubescent, entire, broad-lanceolate bracts.

Commersonia (No. 2); a second species. Under surface of the leaves white. "Upolu," Rich.

(Firmiana? No. 1). The fruit only met with; the segments like a samara of Cedrela, but the seed external. "Upolu," Rich.

Nov. gen. procumbens; Triumfetta of Forster; (bis No. 1 Metia to Aimeo), but seemed more woolly. Leaves broadly-cordate, dentate. Savaii, growing on the strand, rare; also seen on Manua.

(Visenia, No. 1; recorded as) gen. Tiliac. A tree of medium size; leaves cordate, serrulate; cymes pedunc., axillary; five stamens, and five tomentose carpels; the flowers pale purple. Frequent on Savaii.

Eurya? (No. 1). A shrub, four to ten feet high; Camellia-like; leaves alternate, serrate, shining above; stamens five; calyx of about six imbricate scales; petals five, in two series; flowers solitary, axillary, inconspicuous. At the elevation of eighteen hundred feet on the mountain-ridge in Tutuila.

———? (No. 2); a second species. Leaves lanceolate, serrulate. "Upolu," Rich.

Gen. Sapot.? (No. 1; compare Labourdonnaisia); Aegiceras-like. Calyx 6-leaved; petals six; stamens about twelve, awned; style projecting, and very long. Fallen flowers picked up in the forest of Interior Savaii. The leaves that seemed to belong, elliptical, coriaceous, entire, twelve inches by five.

Ximenia (elliptica?, No. 1). "Upolu," Rich.

(Gen. Olacac.? No. 1). A shrub; leaves alternate, obovate, entire, two inches long by an inch wide; short axillary spines; the flowers not seen. Savaii, growing near the coast.

(Pleuropetalon Samoense of Gray?, No. 1; recorded as) Combretac?. A vine, or weak-stemmed shrub, twenty feet; leaves alternate, roundish-ovate, entire, smooth, and reticulate; inflorescence a terminal raceme, the flowers clustered on a common peduncle; calyx of overlapping scales; petals five; stamens five; style single. At the elevation of one thousand feet on the mountains in Tutuila.

(Micromelum minutum, No. 1); Limonia of Forster. Calyx 5-fid; five greenish petals; stamens ten; a terminal corymb. Tutuila.

Calophyllum inophyllum; bis (No. 1 Metia and Taheiti). Tutuila and Savaii; growing only near the sea-coast; and the timber not valued.

———? (spectabile, Willd.; No. 2). A tree; the leaves agreeing in nervation, but

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Urena (No. 1, bis Metia and Taheiti). Abundantly naturalized on Manua, Tutuila, Upolu, and Savaii; (having been introduced by aboriginal settlers).

Hibiscus rosa-sinensis, (No. 1, bis Taheiti). Upolu and Savaii; cultivated for ornament by the natives; (having been introduced by aboriginal settlers).

(Abelmoschus moschatus; No. 1, bis Taheiti). In cultivated ground, on Upolu and Savaii; introduced (by aboriginal settlers).

Sida; compare (No. 2 Metia and) Taheiti. On Upolu, and elsewhere.

———?; perhaps not distinct; but the carpels, about eight in number, smooth and aristate; flowers yellow, and somewhat rotate. Savaii.

——— (No. 4). Having the same habit, but small, branching, and procumbent; leaves pubescent, the petiole rather long. Savaii, growing near the coast.

ovate-lanceolate, acute, six inches long by one and a half broad, rose-colored when young; flowers not seen. A frequent tree on Tutuila and Savaii.

Kleinhovia (No. 1). A tree, fifty to seventy feet high, having long-petioled, cordate, Tilia-like leaves, and pale purple flowers; the petals unequal, as in Polygala. Upolu and elsewhere, frequent.

(Gen. Sapindac.? No. 1; recorded as) Terebinth. ? A tree; leaves pari-pinnate and 5-jugis, having stipules at base, pubescent; the leaflets lanceolate, sinuately dentate. Savaii.

Dodonæa; compare (No. 1 Metia and) Taheiti; but the leaves seemed broader. "Tutuila, on cliffs exposed to the sea," Brackenridge.

(Cupania? No. 1; recorded as) Sapindoid?. Fol. pari-pinnatis, bijugis, integerrimis; a terminal panicle; flowers inconspicuous, green. "Upolu," Rich.

(———?, No. 2). "A tree, forty feet" high; leaves alternate, pari-pinnate, trijugis; the leaflets petioled, ovate, obtuse at base, entire; the nut like a young peach, but trigonal. "Tutuila," Brackenridge.

Gen. Sapindoid? (No. 1). A shrub; leaves alternate, long-petioled, impari-pinnate, 5-jugis; the leaflets inequ., entire, ovate-lanceolate; flowers not seen. Upolu, and elsewhere.

———? (No. 2). The young branchlets stout, and like the peduncles and petioles closely-pubescent; calyx of five scales; petals apparently five; stamens about ten; style single; panic. axillary, towards end of branchlets; short scales on the panicle; leaves impari-pinnate, about 7-jugis, the leaflets ovate, acute, entire. The specimen brought by the forest-king from Interior Savaii.

Ornitrophe? (No. 1). A branching shrub, twelve feet high; leaves alternate, and ternate; the leaflets petioled, obovate, dentate; racemes simple, arising near the end of the branchlets. Savaii.

Cissus (No. 1). Young stocks only; leaves mostly quinate; the leaflets ovate, coarsely serrate, acuminate. Savaii.

(Aglaia Samoensis of Gray?, No. 1; recorded as) Meliac.? Covered with rusty pubescence; leaves pinnate; the leaflets lanceolate, integ.; fruit superior, a third of an inch. "Tutuila," Brackenridge.

Gen. Meliac.? (No. 1). Leaves pari-pinnate, 6-jugis; calyx 4-fid; fruit half an inch, having four cells; panic. axillary. "Tutuila," Brackenridge.

Citrus aurantium, (bis Taheiti). Young stocks only, not yet in bearing; (introduced by trading and colonial Whites).

——— (acida; bis Taheiti); the lemon. Young stocks only, not yet in bearing; (introduced by trading and colonial Whites).

——— (limonum; bis Taheiti); the lime. A tree spoken of, as "in bearing on Tutuila, planted before the arrival of the missionaries, but by whom remains unknown;" (procured doubtless from trading and colonial Whites).

——— sp. nov. (No. 1; compare C. torosa of Blanco). A well-characterized species; the fruit externally resembling an orange, but the rind takes up two-thirds of the diameter, and the pulp is excessively acid; acini small, roundish; petiole widely winged, as broad as the true leaf, and in like manner crenulate on the margin. A small tree, frequent near the coast; (having been introduced by aboriginal settlers).

Gen. (Simarub.? No. 1; a congener of New Zealand Zanthoxylum?). Involucre of floral disc having about six teeth; the enlarging, Ochna-like receptacle bearing as many as seven ovoid, one-seeded berry-like drupes; leaves opposite, entirish, ovate-lanceolate, acuminate, smooth; flowers not seen. On mountains in Tutuila.

(Gen. Acronychioid?, No. 1; recorded as) Amyroid?. A tree of medium size; leaves alternate, obovate, entire, densely and minutely pellucidly-punctate, the petiole articulate at the base of the leaf; calyx 4-fid; petals four, estiv. valv.; stamens eight; style single, very short; flowers inconspicuous, in axillary crowded panicles, that have opposite branches. Savaii.

(———?); perhaps the same species. Leaves subopposite, petioled, elliptical, entire, sometimes trifoliolate; panicles axillary; calyx 4-fid, and petals four; style single; stamens eight, the alternate ones shorter. "A tree on Tutuila," Brackenridge.

(———?). A shrub; leaves opposite, entire, obovate, the petiole articulate at the base of the leaf; the flowers not seen. Savaii.

(———?, No. 2). Having the habit of Ilex; the leaves coriaceous, petioled, entire, punctate; panic. axill., op. pedunc.; calyx 4-fid; petals four; stamens eight, the alternate ones shorter; stigmas four, separating in the ripe fruit; berry or capsule superior, containing four one-seeded cells, but three of the seeds usually abortive. On the mountain-ridge in Tutuila.

Gen. incert. (No. 3; compare Metia and Taheiti). A vine; leaves opposite, comp.; leaflets petioled, ovate, subcordate, integerrim. Upolu.

(Alphitonia, No. 1); gen. Rhamnoid. A tree of medium size, having the habit of Laurus; leaves petioled, ovate, lanceolate, penninerved; axillary few-flowered racemes; the berry half inferior, or with a large disc at base, and containing two seeds. Frequent on ridges in Tutuila.

(Colubrina) Asiatica, (bis No. 1 Metia and Taheiti). Not abundant, perhaps introduced?. Upolu, and elsewhere.

Gen. incert. (No. 1); habit of Rhamnus. Six to twenty feet high; leaves petioled, ovate, acuminate, serrate; flowers in axillary clusters; calyx 5-fid; stigmas seven to eight; the capsule of five one-seeded cells. In the lower portion of Tutuila.

Gen. Terebinth.? (No. 1). Young branches ferruginous; leaves impari-pinnate, entire; the leaflets short-petioled; panic. branch, axillary; flowers very small, greenish; stamens five; style single; corolla 5-fid, or five minute petals?; the fruit not seen. Tutuila and Upolu.

Cardiospermum (No. 1, bis Metia and Taheiti). In cultivated ground, on Upolu and Savaii; introduced (by aboriginal settlers).

(Mallea Rohrii, No. 1; see Voyage of the Astrolabe, vol.); gen. Meliac. A small tree; leaves alternate, and ternate; the leaflets petioled, broad-ovate, serrate; flowers not seen; berries having three or more seeds, rather large. Growing in cultivated ground on Savaii.

Oxalis (repens, No. 1; compare Taheiti). Growing around houses on Savaii; having been introduced (by aboriginal settlers).

(Euodia hortensis, No. 1); gen. Rutac. A spreading shrub; having the odor of rue; corolla 4-fid; carpels about four. In cultivated ground on Tutuila.

———; apparently a second species?. Trifoliolate, with broader leaflets. "Tutuila," Brackenridge.

Gen. Terebinthac.? (No. 1). Ten to sixty feet high; leaves pinnate, two to five feet long, about 18-jugis, tenuiter pubescent; the leaflets subopposite, inequ., subsessile, lanceolate, integerr.; the flowers not seen. Upolu.

Rhus (No. 2); compare (No. 1) Taheiti; the berry black, but compressed as in Mauria. A tree, forty feet high; leaves about 6-jugis, puberulous, the leaflets integerr. Frequent on Tutuila.

(Dendrolobium, No. 1). Desmodium-like, but a branching shrub, six to twenty feet high; the flowers white; pod of three or four joints. Manua, Upolu, and Savaii.

Dolichos; compare (No. 1 Taheiti); yellow-flowered. Maritime; growing on the shores of Pango Pango harbor in Tutuila; also seen on Upolu and Savaii.

Mucuna; compare (No. 1) Taheiti; the pod seeming at first plicate. Savaii.

———; compare the preceding sp. A woody vine, spreading over the tallest trees; stem three inches in diameter; flowers green, on a long peduncle; pod prurient. In wild situations on Tutuila.—Apparently the same species on Savaii, the leaflets smooth, caudate, but the flowers not seen.

(Canavalia, No. 1); the leaflets broad; the flowers purple; the broad and compressed pod bisulcate above, or having a shallow groove on each side of the superior suture. Sands of Apia harbor in Upolu.

(Entada) scandens, (No. 1). The giant "pods hanging among summits of trees on Upolu," Rich and Couthouy. Seeds found by myself on Savaii.

Acacia (No. 1); specimens formerly seen, procured by Forster. No true leaves, but the phyllodia broad-elliptic, four inches by two; capit. small, yellow; pod sharp-edged. A tree of medium size, growing along the sea-coast of Tutuila and Savaii.

Guilandina (No. 1). Growing along the sea-coast of Upolu, but rather rare.

——— (No. 2); a second species. The seeds frequent for two or three miles inland on Savaii; (perhaps, the lofty-climbing species afterwards seen on Tongatabu).

Inocarpus edulis, (bis No. 1 Taheiti). Sometimes flowering from the old wood of the trunk. Abounding on Manua, Tutuila, Upolu, and Savaii; but not seen in the Interior forest.

(Petrocarya, No. 1); the somewhat Balanopteris-like fruit, picked up in the forest on Tutuila. (Compare the "margarata" of the Feejeeans).

Spondias dulcis, (bis No. 1 Metia and Taheiti). Upolu, Savaii, and elsewhere; probably introduced.

Indigofera; compare (Taheiti, and No. 25) the shrubby Peruvian species. Introduced (by trading and colonial Whites); a hedge four feet high, at the Mission Station on Tutuila.

Tephrosia piscatoria, bis (No. 1 Metia and Taheiti). Growing on Manua and Savaii; introduced (by aboriginal settlers).

Desmodium (purpureum?, compare No. 2 Metia and Taheiti). Having crowded flowers. Savaii, and elsewhere.—With blue flowers on Tutuila, the legume pubescent, and of about six joints.

——— (No. 3). Somewhat Onobrychis-like; beautiful rose-colored flowers, among hairy bracts in oblong bristly capitula. Frequent in cultivated ground on Savaii, and elsewhere.

Erythrina; apparently, bis (No. 1 Taheiti). Growing around houses, rare, and young stock only; probably introduced. Tutuila, Upolu, and Savaii.

(Parinarium laurinum of Gray, No. 1; recorded as) Geoffræoid; but the leaves simple, large, and ovate-lanceolate; calyx five-fid; five nearly equal, pale purple petals; stamens ten. A tree of medium size, growing on Tutuila, Upolu, and elsewhere.

Rhizophora (No. 1). A maritime shrub, only four or five feet high, growing in interlaced beds along the coast of Savaii, but rather rare; the leaves above shining, beneath with blackish dots, or rather with rough points; calyx 4-fid, coriaceous. (See Tarawan coral-islands).

Bruguiera (No. 1). A tree of nearly medium size, thirty feet high with the trunk a foot in diameter. Maritime; frequent along the coast of Tutuila and Savaii, growing isolated.

Grossostylis, Forst.? (No. 1). Somewhat Philadelphus-like; lactescent; the leaves subserrate; peduncles binate, flowers somewhat cernuous; a plumose lacin. between every two stamens; and a berried nectary besides, at the base of each stamen; the style divided at the apex into about fourteen segments, and the capsule of as many cells, each one-seeded?. On mountains in Tutuila.

Terminalia (No. 1). A spreading tree of medium size, thirty feet high; leaves obovate, smooth; the flowers larger. Tutuila, submaritime; and seen by Mr. Rich on Upolu.

——— (No. 2); perhaps distinct; agreeing in habit, but pubescent. On the sea-coast of Savaii.

——— (No. 3); a third species. Leaves broad-lanceolate; flowers sericeous. "Coast of Upolu," Rich.

Gen. Terminalioid (No. 1); agreeing in the mode of growth, but the leaves serrulate. A tree of medium size, or perhaps becoming large; leaves attenuate, acute, nine to twelve inches, by three to four; nut ovoid, 5–6-gonal, as large as a walnut, two and a half inches by one and a half, but only seen germinating. Frequent on Tutuila, and in the deep forest of Interior Savaii.

Melastoma; compare (No. 1) Taheiti. Fruit covered with dense paleæ. Tutuila, Savaii, and elsewhere.

Gen. Melastom., (No. 1). A shrub, six feet high; leaves broad, smooth, and 5-nerved; calyx smooth, 5-fid; petals white and wax-like, shining. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

(Astronia, No. 2); gen. Melastomac. Calyx irregularly about ten-cleft; petals five, oblong, as long as the capsule, white; anthers white, with a projecting spur; leaves petioled, smooth, trinerved, not including the marginal nervures. On the mountain-ridge in Tutuila, from the elevation of a thousand to that of two thousand feet.

Abrus precatorius, (bis No. 1 Metia and Taheiti). Planted or naturalized; rare, seen only on Upolu.

Poinciana pulcherrima, (bis Taheiti). Planted for ornament by the natives, and termed by them "a foreigner from Meleke," by some interpreted America. Manua, Tutuila, and Savaii.

Cassia Occidentalis; bis (Taheiti). An introduced weed, as yet rare. Upolu, Rich.

Mimosa pudica; bis Taheiti. Flowers purple. Naturalized, seen only around houses; (to all appearance introduced by aboriginal settlers);

Jambosa? (compare No. 1 Taheiti). Leaves petioled, obovate, penninerved, pellucidly-punctate; flowers from the old wood below the leaves, anthers scarlet. "A tree, fifteen feet high, around houses on Tutuila," Brackenridge.

Myrtus? (No. 2); leaves an inch long, ovate, subsessile; calyx apparently 5-fid; style single; fruit sessile, of the size of a cherry. On the mountain-ridge in Tutuila, at the elevation of two thousand feet.

(Syzygium, No. 1); gen. Myrtac. A small tree; leaves short-petioled, elliptical, acute at each end; inflorescence terminal, corymbose; margin of calyx nearly even. Frequent at the elevation of five hundred feet on Tutuila, on ridge exposed to the sea.

(———?, No. 2); gen. Myrtac. Leaves oblong, acute at each end, the under surface whitish; terminal, opposite-branched panicles; calyx turbinate, the margin nearly entire; petals and fruit not seen. Upolu and Savaii, growing along the coast.

(———?, No. 3); congeneric with the last, forming perhaps a second species. The leaves green on both sides. Savaii.

(Metrosideros No. 2); differing from the Taheitian species. A spreading tree, thirty feet high, with the trunk a foot in diameter; the leaves smooth; the flowers scarlet, but not very showy. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet; rare, and no specimens.

Gen. (Syzygioid, No. 1); Myrtac. Leaves petioled, oblong-elliptic, eight inches by two; a terminal panicle; calyx 4-fid. "Upolu," Rich and Brackenridge.

(———?, No. 2); Myrtac. Leaves obovate, reticulate, entire, pellucidly-punctate; terminal, opposite-branched corymbs; calyx turbinate, corticose, slightly 4-fid; stamens very long and numerous. "Sea-rocks of Tutuila," Brackenridge; and observed by myself on Savaii.

Barringtonia speciosa, (bis No. 1 Metia and Taheiti). Tutuila and Savaii; abundant.

——— racemosa, Lam. (No. 2); a second species. A large, weak-stemmed shrub, having the habit of Marcgraavia, and very long, pendulous racemes; calyx 4-fid; petals four; stamens red, and exceedingly numerous; style single. Tutuila, growing along the banks of streams.

(Melothria Samoensis of Gray?, No. 1); gen. Cucurbitac. Slender, creeping, with deltoid, many-angled, denticulate leaves, and small white flowers. Frequent on Tutuila and Upolu.

(Luffa insularum of Gray, No. 1); leaves with a deep sinus at base, 5-angled, denticulate; fruit oblong, two inches in length, the interior fibrous. Upolu.

———; compare the preceding species. Leaves 7-angled, denticulate, scabriusc; flowers of medium size, yellow, and in long racemes; the fruit not seen. Savaii, ascending trees.

(Citrullus); the water-melon. Introduced; probably from the United States, (by trading and colonial Whites); the fruit inferior to that produced in New Jersey.

Carica papaya, (bis Metia and Taheiti, and No. 1 Tropical America). Cultivated on Tutuila and Savaii.

Portulaca (No. 3); smaller and more delicate than P. oleracea. Prostrate, multicaul; hairs at the base of the leaves; five yellow petals. Introduced (by aboriginal settlers), and growing only around houses. Savaii.

Hydrocotyle (No. 1). Creeping; leaves reniform, dentato-crenate, the crenatures rather large; fruit axillary, pedicelled. Introduced (by aboriginal settlers), and growing only around houses. Savaii.

(Karivia Samoensis of Gray?, No. 1); gen. Cucurb. Leaves cordate, with a deep sinus at base, smooth; fruit smooth, ovoid, of the size of a cherry. "Upolu," Rich.

Weinmannia (No. 2); congeneric with and near (No. 1) Taheiti. A shrub, six to ten feet high; the young twigs slightly hairy. On the mountain-ridge in Tutuila, at the elevation of two thousand feet.

Polyscias (No. 2); compare (No. 1) Taheiti. A straight, simple-stemmed shrub, ten to twenty-five feet high; leaves two to two and a half feet long, penninerved, smooth and somewhat reticulate, petioled. Upolu.

Nov. gen. (Cussonioid, No. 1). A shrub, six to twelve feet high; leaves alternate, one to two feet long, compound or jointed, impari-pinnate, 5–7-jugis; the leaflets articulate at base, petioled, ovate, acute, entire; umbel terminal, very large, irregularly compound; involucels very small, linear; two styles, as in Umbelliferæ; fruit much compressed, smooth, trinerved, the septum linear. Tutuila and Savaii.

(Reynoldsia pleiosperma of Gray, No. 1; recorded as) Araliac.? Leaves and panicl. crowded at end of stout branchlets; the leaves alternate, impari-pinnate, about 4-jugis; the leaflets petioled, broad-lanceolate, entire; peduncled panicles, with whorled branches, and the pedicelled flowers in whorls; past flowering; fruit inferior, striate, crowned with persistent style; seventeen seeds counted, disposed in a single series around axis. The specimen brought by the forest-king from Interior Savaii.

Loranthus (No. 2); flowers below the medium size, tubular, yellow tipped with reddish; branches three to twelve feet long, and more freely spreading than usual. Tutuila and Savaii.

Gen. incert. Cornus-like, (No. 1). A shrub; leaves verticillate in threes, petioled, ovate, acuminate, entire, slightly pubescent; terminal long-peduncled cymes, as in Cornus; calyx apparently inferior, 5-fid; and apparently a corolla; stamens five. Savaii.

Nov. gen. (Morindoid, No. 1). An upright, single-stemmed shrub, twenty to twenty-five feet high, with pendulous capitul. below the crown of large leaves; flowers congested within a common involucre; calyx nearly entire; a deeply-divided Crinum-like corolla, the segments being long and linear; stamens five; style single. Tutuila and elsewhere, but more frequent in the forest of Interior Savaii.

(Morinda?, No. 3). Climbing; leaves petioled, oblong, acute at each end, smooth; the stipule long-acuminate; neither fruit nor flowers. In the coast-district of Savaii.

Nauclea (compare No. 1 Taheiti). A tree, thirty feet high, with the trunk a foot and a half in diameter. Manua and Savaii.

Gen. Coffeac.? round-stipuled; apparently the same with (No. 1) Taheiti. Seen only on Manua.

Gen. Coffeac. large-leaved, (No. 1). An upright, simple, thick-stemmed shrub; the leaves broad-lanceolate, a foot and a half long; the intermediate stipule long; the flowers not seen. In the forest of Interior Savaii.

Morinda citrifolia; bis (No. 1 Paumotuan coral-islands to Taheiti). Introduced; frequent around settlements. Manua, Tutuila, Upolu, and Savaii.

(Gardenia Taitensis, bis No. 1) Taheiti. Seen only in the cultivated state; (having been introduced by aboriginal settlers).

Mussænda (frondosa, No. 1); a conspicuous white floral leaf, and ornamental yellow flowers. Savaii, but not in the Interior; seen also on Manua and Tutuila.

Psychotria? (No. 1); but the intermediate stipule not seen. Terminal corymbs; capsule containing two rough, irregular, and somewhat sulcate seeds. Tutuila.

(——— No. 2); Gardenia-like. A stout-stemmed shrub, nearly simple, eight feet high; leaves lanceolate, a foot or more long, attenuate but sessile, and mostly towards and in the terminal tuft; flowers white, in close, deep-set, axillary clusters, almost terminal; capsule oblong, sulcate, containing two seeds. In the deep forest of Interior Savaii.

(Sabiceoid) with bilabiate calyx, (No. 1; recorded as) Psychotrioid?. Leaves opposite, entire, half-ochreate at base; terminal, few-flowered cymes; fruit inferior, crowned with a bilabiate calyx. "Upolu," Rich and Brackenridge.

(Gen. Mussændoid? No. 2; recorded as) Hameloid?. Terminal corymbs; flowers small, white, the corolla tubular; calyx nearly even; five stamens, and one style. Tutuila and Upolu.

Guettarda speciosa, (bis No. 1 Paumotuan and Bellinghausen coral-islands). Once only met with; growing on Tutuila, at the elevation of five hundred feet on ridge exposed to the sea.

Gen. Coffeoid, long-stipuled, (No. 1). A woody plant; leaves subsessile, six to nine inches long, smooth; the intermediate stipule long-acuminate, or caudate; the flowers not seen. Upolu.

Gen. Coffeoid (No. 2); a second species. Leaves petioled; cymes axillary, sessile; fruit red, pedicelled but not pendulous, roundish. The smaller species, more frequent on Upolu than on the other islands.

——— (No. 3); a third species. Larger; cymes peduncled, pendulous; fruit oblong. In the forest of Interior Savaii.

Gen. Coffea-like (No. 1). A branching shrub, four to six feet high; leaves narrow, lanceolate; petiole smooth; berries red, pedunc., apparently two-seeds. Savaii.

——— (No. 2); a second species. Hairy petiole; lanceolate leaves; red fruit. Savaii.

Gen. Coffeac. square-stemmed, (No. 2). The young branches quadrangular; terminal panicles; berry of two cells, two or more seeded. Savaii.

Gen. Coffeac. with long anthers, (No. 1). Leaves opposite, petioled, turning black in drying; cymes axillary; corolla rather large, spreading at the summit, 5-parted; anthers very long. "Upolu," Rich and Brackenridge.

(Myonima? No. 1); gen. Coffeac. Leaves opposite, petioled, broad-ovate, entire; racemes axillary, opposite pedicell.; berry containing four seeds.

Scævola (compare No. 1 Paumotuan and Bellinghausen coral-islands); but having a different aspect. A single stock met with, growing in maritime sand on Tutuila.

(Geophila reniformis, bis No. 1 Taheiti); leaves reniform-cordate, with a deep sinus; berries red. In pathways on Savaii, but not in the Interior forest; seen also on Manua, Tutuila, and Upolu.

Hedyotis (paniculata; No. 1). A foot high; leaves broad-lanceolate. In cultivated ground, Manua, and Savaii; (a weed introduced by aboriginal settlers).

Bidens; bis Taheiti. On Manua, and Tutuila; probably introduced.

(Wollastonia scabriuscula, No. 1; compare Verbesina biflora of Blume). Stem weak, six to ten feet high; leaves opposite, long-petioled, ovate, serrate, pubescent beneath; involucre 2 to 3-serial; rays yellow and short; receptacle paleaceous; akenium apparently mutic, except paleæ. Frequent on Tutuila, Upolu, and Savaii.

Gen. Myrsin. Myrica-like, (No. 2; compare No. 1 Taheiti). Leaves entire; no fr. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

(Mæsa?, No. 1); Myrsinoid. A shrub, eight to ten feet high; leaves alternate, petioled, ovate, entire; racemes; corolliflor.; stamens five; style single; berry half-inferior; seeds numerous, around a central placenta. Tutuila, growing both on the mountains and near the coast.

Diospyros (No. 1). A tree of medium size; fruit yellow. Tutuila and Savaii; growing in the forest, and sometimes seen planted.

Maba (No. 1). A small and branching tree; dicœcious; calyx and corolla trifid, hairy outside; fruit an oblique, ovoid, yellow, one-seeded drupe, like a naked seed, the covering of cotyledons being membranous; embryo straight, the radicle pointing to the base of the seed. Tutuila.

——— (No. 2); a second species?. "A low tree," having small, broad-lanceolate leaves. "Tutuila," Brackenridge.

Jasminum; compare (No. 1 Taheiti). On Manua.

——— (No. 2); a second species. "A vine;" the leaves very broadly ovate; fruit large. "Tutuila," Brackenridge.

———? (No. 3); a third species. A vine, with simple, opposite, petioled leaves; calyx 5-fid; divisions of the corolla about nine. "Upolu," Rich; and flowers found by myself on the mountain-ridge in Tutuila.

Nov. gen. (Loganioid, No. 1). A woody vine, with opposite, entire leaves, and white flowers; four slight calyx-teeth; corolla monopetalous, tubular, 4-fid, the segments equal; stamens four, equal, alternating with the segments of the corolla; anthers versatile; carpels geminate, elongate, and obovoid. Tutuila and Upolu.

(Alstonia? No. 3); gen. Amsonioid, a third species. A spreading shrub, six to eight feet high; leaves petioled, ovate, penninerved; flowers of medium size, white. On the mountain-ridge in Tutuila, at the elevation of fifteen hundred to that of two thousand feet.

Alyxia (No. 3); a third species. Leaves like those of (No. 1) Taheiti; fruit geminate; imbricate scales on the pedicels; corolla dull yellowish. On ridges in Tutuila.

——— (No. 4); a fourth species. A slender, many-branched shrub; berries geminate, short-stipitate; pedicels not scaly; leaves in threes. On the mountain-ridge in Tutuila.

——— (No. 5); a fifth species. A small, short, tubular corolla; fruit moniliform, ribbed somewhat in the manner of a melon. Manua.

———? (No. 6); a sixth species; but near (No. 2) Taheiti. A vine, ascending trees;

Cotula? (No. 1); leaves petioled, ovate, dentate. Tutuila and Savaii, growing in waste ground around houses; introduced (by aboriginal settlers).

(Myriogyne minuta, No. 1, bis Taheiti). Growing around houses on Savaii; (introduced by aboriginal settlers).

(Adenostemma viscosum, No. 1); bis Taheiti. Manua, Tutuila, Upolu, and Savaii; introduced (by aboriginal settlers).

Cerbera; compare (No. 1) Taheiti. A tree of medium size; large white bracts; fruit large, compressed-ovoid, red when ripe. Savaii; growing near the coast, and perhaps introduced.

the leaves larger than in the other species, verticillate in threes; the drupe also larger, solitary, three-fourths of an inch long by half an inch thick. Tutuila and Savaii.

(Tylophora?, No. 1); gen. Cynanchoid. An herbaceous vine; leaves ovate, subcordate, acuminate; umbel long-peduncled; flowers small, greenish; follicles geminate, long, tapering towards the apex; seeds flat, pencilled. Savaii.

(———); perhaps a second species. The leaves larger, four inches by three, cordate; umbel compound, slightly pilose; flowers small, greenish. Savaii.

Hoya (No. 1). Smooth; leaves broad-lanceolate, acute, opposite, often falsely alternate from the deficiency of one in each pair; follicles long; seeds tufted. Frequent on Savaii.

——— (No. 2); a second species. Larger; stem closely puberulous; leaves broad at base. In the forest of Interior Savaii.

——— (No. 3); perhaps a third species. Stem smooth and fleshy; leaves large, subcordate at base, elliptical; flowers white. Manua.

Cerbera (No. 2); a second species. "Upolu," Rich.

(Geniostoma, No. 2). A shrub, eight feet high; leaves opposite, herbaceous, entire; flowers axillary; about five calyx-teeth; corolla 5-fid, inconspicuous, hairy inside; stamens five, style one; capsule of one cell, bivalved, the seeds numerous. In the coast portion of Tutuila, and elsewhere.

——— (No. 3); seeming distinct; the leaves coriaceous, a margin becoming visible when held to the light; capsule superior. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

(Labordia, No. 2); a second species. Tube of the corolla more slender, and longer than in the Taheitian species; the five calyx-segments overlapping as in Convolvulus; the calyx bibract. at base; stamens five; seeds small, numerous. Savaii, somewhat rare.

(Ipomoea) pes-capræ; bis (Brazil, and No. 2 Metia and Taheiti). Manua, Tutuila, and Upolu, growing in maritime sands.

(Calonyction, No. 1); much resembling Ipomoea turpethum. Leaves broad-cordate, reticulate, penninerved, acuminate, the basal sinus open; flowers white, the tube of the corolla four inches long. Growing along the sea-shore of Tutuila

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(Batatas edulis, No. 1; compare Taheiti). Leaves cordate-hastate; flowers purple; capsule small, 3 to 4-lobed. Frequent in cultivated ground on Tutuila and Savaii; but not used.—The sweet potato (bis Metia to Taheiti) abundantly cultivated; (having been introduced by aboriginal settlers).

Nicotiana tabacum, (bis Metia and Taheiti, and No. 6 North America). Very generally cultivated in small patches around the houses of the natives; (having been obtained from trading and colonial Whites). Manua and Savaii.

Physalis; bis (Taheiti); small, smooth. Tutuila and Savaii, growing around houses; introduced (by aboriginal settlers).

——— (edulis, bis Taheiti, and compare No. 7 Chili and Peru); the "Cape gooseberry;" pubescent. "Upolu," Rich and Brackenridge.

Solanum repandum?; bis (No. 1) Taheiti. Habit of S. melongena; the fruit pubescent. Naturalized in cultivated ground on Tutuila, Upolu, and Savaii; introduced (by aboriginal settlers).

——— nigrum?, (bis Taheiti, and compare No. 28 California, Chili, and Peru); flowers very small; berries black. Tutuila and Savaii; introduced (by aboriginal settlers).

(———, No. 2); leaves broad-cordate, angulate, long-acuminate, long-petioled; peduncle also long; corolla white, with the tube four inches in length. Savaii, growing in cultivated ground.

(Rivea? No. 2); gen. Convolv. Leaves peltate; corolla campanulate, white with the margin yellow. Frequent on Savaii.

Tournefortia (argentea, bis No. 1 Paumotuan and Bellinghausen coral-islands). Manua.

(Gen. Cordiac, No. 1). A shrub or tree; leaves alternate; cymes apparently opposite to the leaves; seen only in fruit, the calyx 2 to 3-fid at the summit, and entirely covering the capsule. Savaii.

Nov. gen. aspera, (No. 1); Cordia of Forster. A shrub, ten to fifteen feet high, with a few straight (but spreading) branches; leaves petioled, ovate, long-acuminate, denticulate; hard, rusty pubescence; cymes peduncled, term.?; flowers small and inconspicuous; nut apparently single, tuberc., and very hard. Upolu and Savaii.

Solanum (No. 2); leaves lanceolate; fruit red. Islet of "Ulasinga," Capt. Wilkes.

——— (No. 3); a third species. "Upolu," Rich.

Gen. (Cestroid, No. 1) Solanac. A shrub, six to fifteen feet high; leaves inequ. at base, ovate, acute at each end; flowers white, like Brazilian sp. Frequent on Upolu and Savaii.

Cyrtandra (No. 3). A shrub, three feet high; leaves attenuate, inequ. at base, above shining, the under surface whitish; flowers few and large, with broad bracts. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

——— (No. 4). An upright, thick-stemmed shrub, ten to fifteen feet high; leaves broad-lanceolate, one and a half to two feet long; flowers rather small, greenish, somewhat urceolate, in axillary clusters; two perfect stamens. In the deep forest of Interior Savaii.

——— (No. 5); leaves similar in shape, broad-lanceolate, but only six to seven inches long; flowers white, larger, the corolla more distinctly bilabiate. Savaii.

——— (No. 6); leaves broad, oblong, acute at each end, the nervures pubescent; flowers hairy, inclosed in a white, hairy involucre. In the deep forest of Interior Savaii.

——— (No. 7); leaves broad-ovate, twelve inches by seven, the under surface white; flowers of medium size. Frequent in the coast-portion of Savaii.

Gen. Cyrtandroid (No. 1). Habit of Gesneria, herbaceous, a foot high; leaves serrate, inequ., covered with fine bristles; flowers not seen. Epidendric on trunks of trees, in the deep forest of Interior Savaii.

(Curanga, No. 1; or compare Bonnaya). Gratioloid, but the flowers blue; leaves broad-ovate, serrulate. Banks of streams on Tutuila; (seeming indigenous, and perhaps really so).

Lindernia (No. 1), bis Taheiti. Frequent on Tutuila, Upolu, and Savaii; probably introduced.

Ocymum (sanctum?, No. 1), bis Taheiti. Tutuila and Savaii; clearly introduced, (and by aboriginal settlers).

Leucas 10-dentatus; bis (Metia to Taheiti). Manua, Tutuila, Upolu, and Savaii; clearly introduced, (and by aboriginal settlers).

Justicia (purpurea?, No. 1); calyx 2-leaved; flowers purple. "Upolu," Rich.

Boerhaavia (procumbens?, bis No. 3 Metia to Taheiti). Upolu and Savaii; growing only in cultivated ground, evidently introduced, (and by aboriginal settlers).

Ocymum (No. 2); leaves long-petioled, deltoid, the serratures large; a terminal raceme. Observed only on Manua; seeming indigenous on dry rocks.

(Premna, compare No. 1 Metia to Taheiti); but the leaves seemed broader. A shrub, six to eight feet high; terminal cymes; calyx slightly dentate; corolla small, greenish, 4-fid, one segment a little reflexed; four stamens, and one style; fruit not seen. Upolu and Savaii; growing along the sea-shore.

Clerodendrum (inerme, No. 1). A shrub, four to six feet high; stem with close pubescence; leaves ovate, acute at each end. Manua, Tutuila, Upolu, and Savaii.

Vitex (No. 1); leaves quinate; leaflets integerrim., the under surface whitish, with short pubescence. Savaii, growing along the sea-shore.

Desmochæta; compare (No. 1) Taheiti. Tutuila and Upolu, frequent, but not seen far inland.

Cassyta; bis (No. 1 Paumotuan and Bellinghausen) coral-islands. On Manua and Savaii.

Myristica (No. 1). A tree of medium size; leaves very large; fruit size of a peach, and more woolly than in the next species. In deep woods on Tutuila and Savaii.

——— (No. 2); a second species. A tree of medium size; leaves smaller, attenuate petioled, the under surface whitish-rufescent; fruit much smaller, and more elongate, of the size of an almond. Abounding on Tutuila and Savaii.

Dais? (No. 1). A shrub, or small tree; leaves ovate, short-petioled; the petioles channelled; stamens eight, the alternate ones shorter; ornamental red fruit; capsule apparently of two cells. Tutuila and Savaii.

Gen. (Dais-like, No. 1) Daphnoid. The extreme branches dichotomous; leaves broad-ovate, short-petioled; flowers purple, not expanding. Tutuila.

——— (No. 2); a second species. Leaves larger, six inches by three, ovate, acute, subsessile; the clusters of flowers with large bracts; flowers red-purple. Upolu.

Daphne; compare (No. 1) Taheiti. Flowers green; berries red. On the mountain-ridge in Tutuila, at the elevation of seven hundred feet.

Aristolochia (No. 1). A vine; leaves petioled, broad-ovate, inequ., 5 to 7-nerved, smooth on both sides; corolla slender, two inches long, the lip not large. On the mountain-ridge in Tutuila, at the elevation of eight hundred feet.

Hernandia sonora? (No. 1; see Otafuan coral-islands). A tree, seventy feet high, with the

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Achyranthes (compare No. 2 Metia to Taheiti and Bellinghausen coral-island); green florets. Abounding on Tutuila, Upolu, and Savaii.

Amaranthus (No. 1, compare Metia); a low species. Savaii; evidently introduced, (and by aboriginal settlers).

Aleurites triloba; bis (Metia and No. 1 Taheiti); leaves 5 to 7-lobed. Manua, Tutuila, Upolu, and Savaii; but not seen in the Interior forest.

Euphorbia (No. 2); habit of E. lathyris. Tutuila, in cultivated ground; evidently introduced, (and by aboriginal settlers).

(Codiæum) variegatum, (No. 1). A shrub; the leaves alternate, petioled, lanceolate, spotted after the manner of Aucuba. Tutuila, near houses; introduced (by aboriginal settlers).

Acalypha? (No. 1). Habit of A. Caroliniana; small-leaved. "Upolu," Rich.

Broussonetia (papyrifera, No. 1; bis Metia). Seen under cultivation; for the sake of the bark, which is beaten into "tapa," or bark-cloth. Savaii.

trunk four to six feet in diameter; leaves smooth, alternate, broad-ovate, peltate, entire; terminal clusters surrounded by four obtuse bracts disposed in a whorl, and consisting of two male flowers and one female, but sometimes there are two female flowers; male flowers 6-parted, the three outer segments calyciform, the three inner ones corolliform, the stamens three, each arising between two scale-like nectaries; female flowers 8-parted, the four outer segments calyciform, the four inner ones corolliform, the style with four berry-like nectaries. Tutuila and Savaii; sub-maritime, growing only along the sea-shore.

——— (No. 2); leaves oblong, acute at each end, petioled, entire, Laurus-like; panic. axillary, long-peduncled; fruit externally the same, but the structure not examined. The specimen brought by the forest-king from Interior Savaii.

Gen. Cupanioid? (No. 1); also somewhat Rhamnoid. A tree, sixty to eighty feet high, with large peltate leaves; the leaves alternate, broad-ovate, eighteen inches by twelve, slightly denticulate, a long stipule at base; large panic.; diandrous(?); capsule didymous, two-valved, two-celled (sometimes three-celled?), each cell containing a globular, rough, and very hard seed. Frequent on Savaii; rare on the other islands.

Euphorbia (compare No. 1 Paumotuan coral-islands to Taheiti). A foot high; habit of E. hypericifolia, but the leaves entire, inequally cordate at base. Manua and Tutuila, growing along the sea-shore, and elsewhere.

Nov. gen. (Tanarius; compare No. 1 Taheiti); Ricinus of authors. A spreading, sub-herbaceous, thick-stemmed shrub, ten to twenty feet high; leaves broad-ovate, peltate, denticulate; axillary racemes or spikes; flowers dioecious; fruit Ricinoid, with soft lacin. on surface; seeds tuberc. Tutuila.

(Omalanthus? No. 2); habit of Stillingia sebifera. A shrub, eight to twelve feet high; styles two, capsule of two cells. Frequent on Manua and Tutuila.

——— (No. 3). A tree, sixty to eighty feet high; leaves larger, deltoid, poplar-like, entire, acuminate, the under surface whitish; flowers monoecious?; fruit large and hard, short-ovoid or somewhat angular, containing three cells. Frequent in the Interior forest on Savaii.

Phyllanthus; compare (No. 1) Taheiti; low. Manua, Tutuila, and Savaii.

(Glochidium, No. 3); a third species. A tree of medium size; calyx 6-phyll.; capsule dividing into about ten cells. Frequent on Tutuila.

Gen. (Antidesmoid?, No. 1). A tree; leaves alternate, petioled, obovate, entire; flowers

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Artocarpus incisa, (No. 1, bis Metia to Taheiti). Cultivated abundantly throughout the Group; and always seedless.

———; a distinct variety, or possibly species?. The leaves similar in outline, but not divided into lobes; the fruit also similar, except in often containing seeds; these are of large size, somewhat resemble the nuts of the betel-palm, and are "not known to ripen." Upolu and Savaii, abundantly cultivated.

Ficus (No. 8; compare No. 1 Otafuan coral-islands); leaves rather small, ovate, petioled. "Tutuila," Brackenridge.—Perhaps the same species on Savaii, (an ornamental tree, with dark foliage, and orange-colored pea-like fruit, planted near houses).

Piper (methysticum, No. 6); the "cava-pepper;" a sixth species. Differing from the Taheitian in being lower and more branching, with the knotted stem stouter; leaves cordate, acuminate. Tutuila and Savaii; seen only under cultivation, (having been introduced by aboriginal settlers).

inconspicuous, dioecious; calyx 5-phyll.; four bilobed anthers; style single?; berry superior, hairy; bract on pedicel; racemes axillary. Tutuila.

——— (No. 2); congeneric, but the calyx seeming monophyllous and 5-fid; three stigmas; capsule smooth; flowers dioecious, subsessile; aments sometimes branching; leaves smooth, elliptical, acute at each end, entire. Savaii.

Elatostema (No. 2); a second species. Stem slightly hairy; leaves three inches long, trapezoid-serrate. Tutuila.

——— (No. 3); a third species. Leaves rhomb., inequ. at base, serrate, acuminate, three to four inches long; inflorescence axillary, sessile, also long, radical pedunc. In the deep forest of Interior Savaii.

——— (No. 4); a fourth species. Tenderly herbaceous; leaves three inches long, reticulate on both sides. In the deep forest of Interior Savaii.

——— (No. 5); a fifth species. Leaves half an inch to an inch long, trapezoid, dentate. Savaii; growing on the bed of a watercourse, three miles from the sea.

——— (No. 6); a sixth species. Stem much divided; leaves linear-lanceolate, dentate. In the deep forest of Interior Savaii.

(Sciophila), bis (No. 1 Metia to) Taheiti. Smooth; sometimes epidendric. Manua and Upolu.

(Epicarpurus? No. 1; recorded as) nov. gen. Elatostem. An upright, single-stemmed shrub, ten to twenty-five feet high; the young, herbaceous portion hairy; leaves alternate, oblong, nine inches by two and a half, acuminate, slightly serrate; two long styles; fruit in axillary clusters. Frequent in the forest of Interior Savaii.

Gen. Urticoid (No. 3). Suffruticose, two to five feet high; leaves opposite, large, long-petioled, broad-ovate, serrate; small, orange-colored berries, crowded in axillary clusters. Frequent on Tutuila and Savaii.

Gen. Urticac. Acalyphoid, (No. 1). Herbaceous, two to three feet high; habit of Acalypha, but the seeds compressed and margined; leaves alternate, long-petioled, broad-cordate, dentate. Tutuila and Savaii.

Gen. Urticac. (No. 1); the "stinging-tree." Entirely smooth; the young shoots seem half-articulated, somewhat as in Ficus; leaves alternate, petioled, cordate, acute, seven inches by four, with a deciduous stipule at base; cymes unilateral, axillary, peduncled, many times and very delicately divided, so that the flowers must be very minute, also full of small, linear bracts. The specimen brought by the forest-king from Interior Savaii. The tree was heard of on other islands of the Group, as much dreaded by the natives; the living leaves said to "sting severely, if the part exposed be wet."

(Urticoid, No. 1; recorded as) Boehmeria. Leaves long-petioled, in pairs composed of a

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Casuarina equisetifolia, (No. 1, bis Metia to Taheiti). "Upolu," Rich and Brackenridge; not seen by myself.

Canna (Indica, bis Taheiti and No. 1 Brazil and Peru); leaves acuminate; flowers scarlet. Upolu and Savaii, only seen cultivated.

Zingiber (zerumbet, No. 1). One to two feet; the scape six to twelve inches, watery; leaves ochreate at base, six to eight inches by one and a half, acute. Abounding along pathways on Tutuila, and in the coast-district of Savaii, but not seen in the Interior; probably introduced. The taste is like that of ginger, but bitter.

large leaf and a small one, alternating; long, glom. aments. "Upolu," Rich and Brackenridge.

Procris? (No. 3). A tree of medium size; leaves alternate, ovate, subcordate. Tutuila and Savaii.

(Gen. Morus-like, No. 1; recorded as) Procris?. The agglomerate fruit white, somewhat resembling that of Morus alba, and similar also in taste; leaves ovate, acuminate, the under surface white. Frequent on Savaii.

Celtis? (No. 2). A small tree, with long branches; leaves cordate, long-acuminate; inflorescence axillary. Frequent on Tutuila and Savaii.

Gen. Urticac.? (No. 1). Leaves alternate, somewhat resembling those of Pyrus communis; the young shoots articulate; aments simple. "Upolu," Rich and Brackenridge.

Ficus; apparently the Taheitian sp. On Upolu.

——— (No. 4); leaves inequally-cordate at base, oblong, acuminate; fruit glob., sessile, densely setose. Savaii.

——— (No. 5); leaves smooth, oblong, inequ., the nervures directed forwards; fruit pedicelled. In the forest of Interior Savaii.

——— (No. 6); leaves cordate at base; fruit long-pedicelled, apparently smooth. Savaii.

———? (No. 7); by resident Whites improperly termed the "banyan tree." One on Upolu was visited by Mr. Rich; but proved lofty and inaccessible, so that he was unable to procure specimens, or persuade the natives to ascend. (Compare the species afterwards seen on Tongatabu and the Feejee Islands).

Piper (No. 3); a third species. A vine, overspreading trees a hundred feet high; leaves ovate, 5-nerved; spike very long. Frequent on Tutuila and Savaii.

——— (No. 4); a fourth species. A shrub; leaves round-cordate, acuminate. Tutuila.

——— (No. 5); a fifth species. Creeping and rooting on the trunks of trees; leaves cordate, acuminate; spikes not seen. Tutuila and Savaii.

Peperomia (No. 2); leaves alternate, ovate, acute, short-petioled. Frequent on Tutuila and Savaii.

——— (No. 3); compare the last sp. Leaves alternate, elliptical, or obovate. Savaii.

——— (No. 4); leaves opposite, lanceolate, petioled, three inches. "Upolu," Rich and Brackenridge.

Curcuma (No. 1, compare Taheiti); turmeric. The powdered root used by the natives, but the plant not seen.

Musa paradisica, (No. 1; bis Metia to Taheiti). As many as "twenty varieties" cultivated by the natives; including one that bears perfect seeds, (the only seeds of a Musa I have ever met with). Manua, Tutuila, and Savaii.—A "Chinese variety" had been introduced by the missionaries; the single stock at the station on Upolu not yet in flower; the leaves mutic, the under surface slightly glaucous.

——— nov. sp. (No. 2; bis Taheiti), but a different variety, called the "puputa." The swelling and very large fruit having the shape of a young cocoa-nut; the spadix upright and simple, or the carpels arising singly from the central rachis or flower-stem; the leaves long-acuminate, or distinctly caudate; flowers single and very large. Savaii, only seen cultivated; the fruit when eaten, coloring the urinary secretion.

Crinum (No. 1); large. Savaii; and seen by Mr. Brackenridge "cultivated on Manua."

——— (No. 5); leaves elliptical, hairy, 5-nerved, the under surface white. "Upolu," Rich and Brackenridge.

Gen. incert. (No. 1). A shrub; leaves alternate, long-petioled, broad-lanceolate, acuminate, entire; the flowers not seen. Tutuila and Savaii.

(Halophila ovata, Gaud., No. 1). Two or three inches high, creeping, rooting at intervals; leaves Potamogeton-like, elliptical, long-petioled, papill., stipules at base?; fructif. not seen. Marine, growing on the bottom in shallow water, and loosely overspreading considerable tracts of the inundated coral-shelf; Tutuila and Savaii.

Nov. gen. Corallorhizoid (No. 1). Etioled, or in no part green; devoid of leaves; the flower usually single; capsule large. Tutuila, growing in the deep shade of the mountain-forest; and seen by Mr. Rich on Upolu.

Gen. Neottoid (No. 1). Two to three feet high; leaves lanceolate, sometimes ten inches long; capsule rather small. On mountains in Tutuila, and in the forest of Interior Savaii, rare.

——— (No. 2); a second species. A foot high; leaves with the median nervure white, Goodyera-like. Frequent in the forest, on Tutuila and Savaii.

——— (No. 3); congeneric. A foot high; stem pubescent; leaves green, lanceolate. Frequent on Tutuila and Savaii.

——— (No. 4); leaves petioled, ovate-lanceolate, about five inches long; flowers large, and white.

——— (No. 5); a fifth species. Smaller flowers; leaves petioled, ovate, three inches long. In the deep forest of Interior Savaii, rare.

Pterocheilus (No. 1); leaves inequ., ovate, nerved; reflexed bracts; flowers small, purplish. Frequent on Tutuila and Savaii.

(Nervilia, No. 1; recorded as) nov. gen. Epipactoid. Scape a foot high; leaves long-petioled, reniform; flowers green, pend.; long lacin. to corolla. Savaii.

(——— No. 2); possibly a second species?; sheaths larger and looser; leaves not seen. "In sand on Tutuila," Brackenridge.

Bletia? (No. 1). Stem three to five feet high; leaves lanceolate, ribbed, two to three feet long; flowers purple and rather showy. Tutuila, growing in a savanna or natural opening, at the elevation of five hundred feet.

Gen. Serapioid (No. 3). Three to five feet high; leaves two feet by five inches, ribbed; bracts elliptical, acuminate; fruit pedicelled, large Savaii.

Calanthe (No. 1). Habenaria-like; corolla large, white, the lip 4-parted. "Upolu," Rich and Brackenridge.

Gen. Orchioid? (No. 1). Oncidium-like, but growing on the ground; stem six inches;

Dioscorea; compare (No. 1 Metia to) Taheiti. Leaves broad-cordate, long-acuminate; the "roots bitter, not edible." Savaii, frequent in cultivated ground.

———; compare (No. 2 Taheiti). Leaves broad-sagittate. Frequent on Savaii.

(——— pentaphylla?, No. 3; recorded as) Convolvulus; compare Taheiti. Five-leaved; flowers and fruit not seen. Savaii.

——— alata, (No. 4); stem 4-alate. Upolu and Savaii; cultivated, (having been introduced by aboriginal settlers).

Tacca (No. 1, bis Metia to Taheiti); the Polynesian "arrow-root." Abundantly cultivated on Savaii.

Dracæna terminalis, (No. 1 bis Metia to Taheiti). Extensively cultivated on Manua,

leaves nerved, lanceolate, four inches by three-fourths of an inch. At the elevation of five hundred feet on ridge in Tutuila, rare.

Oberonia (No. 3); a second species with equitant leaves. Fructification so crowded as to resemble spikes of a Plantago. Savaii.

——— ? (No 4); perhaps distinct; the leaves rather distant. "Tutuila," Brackenridge.

(Tacniophyllum) fasciola; bis, perhaps (No. 1) Taheiti. Frequent on Manua, Tutuila, and Upolu.

Dendrobium; compare (No. 1) D. biflorum of Taheiti, but the fr. seemed larger. Manua ?, and frequent on Savaii.

——— (No. 4). Pendulous; leaves linear, six inches by an eighth of an inch; flowers and fr. not seen. Savaii.

——— (No. 5). One to two feet long; flowers rose-colored; capsule triquetrous. "Upolu," Rich and Brackenridge.

——— (No. 6). Pendulous, six to ten feet long; leaves lanceolate, six inches by half an inch; racemes few, short, axillary; corolla with a long spur. Savaii, on bread-fruit trees, rare.

Nov. gen. Orchid. (No. 1). Suffruticose at base; leaves lanceolate; flowers in term. clust., with broad spathe; a slight sack; the corolla white, with the very short lip entire, included, and red at the apex. On trunks of trees on the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

Epidendrum ? (No. 1). Stem erect, two to three feet high; rigid elliptical leaves; axillary panicles of large flowers, yellow tinged with green. Savaii, and elsewhere, growing on rocks near the sea-shore.

——— (No. 2); possibly distinct; the leaves longer; large flowers. "Tutuila," Brackenridge.

Gen. Orchid. with ribbed leaves, (No. 1). Leaves two, distant from the root, lanceolate, ribbed; a long, terminal raceme; capsule rather small. Tutuila and Savaii, growing on bread-fruit trees.

Gen. Dendrobioid with concealed flowers, (No. 1). Epidendric; very small; creeping, branch. radic.; leaves an inch and a half long, ovate, having a bulb at base; flowers minute, concealed. On the mountain-ridge in Tutuila, at the elevation of fifteen hundred feet.

Upolu, and Savaii, and "twenty varieties" distinguished by the natives; not seen naturalized. A young stock of the red-leaved variety seen on Manua.

Ananas (bis Taheiti, and No. 1 Tropical America); the pine-apple. Now cultivated, (having been obtained from trading and colonial Whites).

Gen. Commelin. (No. 1). Small white flowers; two of the petals larger. Frequent in cultivated ground on Savaii.

Commelina ? (No. 1). Flowers larger and blue; two of the petals larger than the others. Frequent in cultivated ground on Savaii, (having been introduced by aboriginal settlers).

Cocos nucifera, (bis Paumotuan coral-islands to Taheiti). Abundantly cultivated. The milk is sometimes heated in the shell; (the only approach to boiling, I witnessed anywhere in Polynesian cookery).

Gen. Steloid? (No. 1). Very small; leaves lanceolate-linear, about two inches long; inflorescence axillary. On the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

———? (No. 2). About eight inches; compressed bulb, with axillary flower-stems; flowers small, white. On the mountain-ridge in Tutuila.

Gen. Orchid. large-fruited, (No. 2); a congener of Taheitian sp.?. Epidendric; large, bulb.; leaf single, large, ribbed; capsule very large, having six crests. On the mountain-ridge in Tutuila, at the elevation of two thousand feet.

(Dendrobioid, No. 1). Leaves lanceolate, having a bulb at base; capsule very large, but not alate. "Top of ridge in Tutuila," at the elevation of fifteen hundred feet, Brackenridge.

(Gen. Maxillarioid? No. 2). Leaves elliptical, obtuse, articulate on an elongated bulb, that looks like a continuation of the stem. "Tutuila," Brackenridge.

Epidendroid? (No. 1); but the inflorescence a terminal raceme. Leaves lanceolate, bifarious, one and a half inches by a third of an inch; capsule three-fourths of an inch long. Savaii.

Gen. Oncidioid? (No. 1). Four to five inches; leaves lanceolate, three inches long; flower-stems axillary; flowers of medium size; the capsule very long, two and a half inches. Savaii, frequent on bread-fruit and other trees.

(Amomum, No. 2); compare Taheitian sp. Large; leaves lanceolate, a foot or more long, acuminate, slightly ciliate; the flowers not seen. In the forest of Interior Savaii.

Nov. gen. Musac. (No. 1). Heliconia-like, but the compressed, equitant, floral bracts are not bright-colored, acquiring only a yellowish tinge, and the lower one is very little longer than the others. The leaves have a short-acumination, entirely resemble and might be mistaken for those of the banana; except that they stand upright, six or more on each stock, making the total height twelve to fifteen feet. The three seeds are stony and very rough, hard, gritty, and irregular.

Dioscorea (No. 5). The stem as thick as the little finger, paleaceous at base; young, with the leaves not yet expanded but apparently ovate; each stock producing a bushel of edible roots. In the forest of Interior Savaii, known only in the indigenous state.

Nov. gen. Asparag.? (No. 1). Leaves broad-lanceolate, ribbed, ochreate at base; a

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(Borassus flabelliformis?, No. 1); the fan-palm. Twenty-five feet high, the trunk rather slender; fronds flabellate; calyx in two series, the inner scales or segments about five, mucronate; nut of the size of a cherry, the apex regularly terminal, the outer envelope pithy and fibrous, the shell hard; the seed solid, not adhering to the shell, and a large, oblong hilum. Planted in the village on Manua; and "seen on Upolu" by Rich and Brackenridge.

Pandanus (bis No. 1 Paumotuan coral-islands to Taheiti). Cultivated sparingly, and evidently introduced. Manua, Upolu, and Savaii.

(Colocasia) macrorhiza, (No. 1, bis Metia to Taheiti); the leaves not peltate. Abundantly cultivated, and seemed more valued than at Taheiti. Manua, Upolu, and Savaii.

(——— antiquorum, No. 2, bis Metia to Taheiti). Abundantly cultivated, and several varieties distinguished by the natives. On Savaii, half-wild taro-plantations commence regularly behind the cocoa-palms and bread-fruit trees, at a little distance from the coast; observed also under cultivation on Upolu.

terminal panicle; calyx 6-phyll., scarious; no corolla; capsule or berry containing more than one seed. In the forest of Interior Savaii; and also on Upolu.

(Areca, No. 1). A palm, seventy to eighty feet high; fronds pinnatisect, the segments 3-nerved; inflorescence eight or ten feet below the fronds, the spathe thick and very large, six feet by a foot and a half; calyx of five imbricate scales; nut of the size of a cherry, with the apex turned laterally, the husk a little fleshy externally, and then fibrous. In the forest of Interior Savaii; also on Upolu.

(Caryota? No. 1). "A small palm, the stem slender, only two inches in diameter. Upolu," Rich.

Pandanus (No. 2); apparently a second species. Six to twenty feet high; leaves triquet., long-acuminate, the marginal serratures coarser, fang-like, and pointing forwards; fruit entirely similar to that of the first species. Seen only on the mountain-ridge in Tutuila, from the elevation of eighteen hundred feet to the summit.

Freycinetia (No. 2); a second species. Very near (No. 1) Taheiti, but the stem stouter, and the leaves larger; margin of the leaf hardly serrulate, but distinct teeth on the midrib; the floral leaves not colored. A decumbent shrub on mountain-ridges in Tutuila.

——— (No. 3); a third species. Climbing, profusely enveloping the trunks of trees; the floral leaves orange-colored. Abounding on Savaii, but seen flowering by myself only on Tutuila.

Pothos (No. 1); leaves broad at base, very large, with natural slits or deep incisures; the flowers not seen. Investing trunks of trees on Tutuila, frequent.

———; perhaps distinct; leaves broad at base, but small. Savaii.

——— (No. 2); leaves a foot and a half in length, broad-lanceolate, attenuate at base, long-petioled; flowers not seen. Investing trunks of trees on Savaii.

———; perhaps the same with the last; leaves small, attenuate, broad-lanceolate, acuminate. Savaii.

Flagellaria (No. 1). Climbing, a hundred and fifty to two hundred feet long; a dense, branching panicle; calyx five-leaved; stamens apparently six. Abounding, but only once seen in flower.

Arum Rumphii, (No. 1); the "teveh." Leaves trichotomously? divided; flower not seen. Cultivated rather frequently on Tutuila and Savaii, (having been introduced by aboriginal settlers).

Rhynchospora (No. 1); near R. corniculata of North America, but rather smaller. Tutuila; (seemingly at home, but perhaps introduced by aboriginal settlers).

Kyllingia (monocephala, No. 1), apparently bis Taheiti. On Manua, Tutuila, Upolu, and Savaii; probably introduced.

Cyperus; bis (No. 1 Metia to) Taheiti. Glaucous. Manua, Upolu, and Savaii; probably introduced.

Mariscus (paniceus, No. 1; bis Metia to Taheiti). On Manua, Tutuila, and Savaii; probably introduced.

Panicum; compare (No. 1) Taheiti. Tutuila and Savaii.

——— (No. 2); a second species. Small florets. In cultivated ground on Tutuila; (introduced by aboriginal settlers).

Saccharum officinale, (No. 1, bis Metia to Taheiti); the sugar-cane. Cultivated "chiefly

Nov. gen. Sclerioid? (No. 1); habit of Dichroma. Growing in large tufts, three to five feet high; leaves an inch wide; nut very hard, one-seeded. Tutuila and Savaii.

Scleria (No. 2); a second species. Habit of our North American species; slender, few-flowered, the leaves linear and triquetrous. Upolu, once only met with.

——— (No. 3); a third species. Large, leafy, many-flowered. Frequent throughout the Group.

Fimbristylis (No. 2); a second species. Rather small. Growing in wet places on Tutuila and Upolu.

Gen. Scirpoid; bis (No. 1) Manhii coral-island and Taheiti. The term. capit. Eriocaulon-like or Schœnus-like, devoid of conspicuous bracts. "Sea-rocks of Tutuila," Brackenridge.

Cyperus (No. 2); a second species. Not glaucous; long spik. Manua.

——— (No. 3); a third species. Near our North American C. strigosus. "Tutuila," Brackenridge.

Mariscus (No. 2); small capit. Manua.

Gen. Paniceæ? (No. 1); monoecious?, as seed single. Creeping, few-flowered. Tutuila and Upolu; maritime.

(Cynodon dactylon?, compare No. 1 Taheiti; recorded as) Digitarioid. Small, creeping; the flowers pointed. Savaii.

Bambos (No. 1; bis Taheiti), but seemed taller, and the stems more weak and brittle; not seen in flower. Frequent in the deep forest of Interior Savaii, and therefore probably indigenous. Cut stems seen in use on Upolu, and the other islands.

Gen. Poac.; bis (No. 1) Taheiti. Apiculate florets. Manua and Upolu; and seen by Mr. Brackenridge on Tutuila.

Ischæmoid? (No. 2); prostrate, aristate. "Sea-rocks of Tutuila," Brackenridge.

Lepturus (repens?, compare No. 1 Paumotuan and Bellinghausen coral-islands). "Sea-rocks of Tutuila," Brackenridge.

Orthopogon (compare No. 1 Taheiti). On Manua; and seen by Mr. Brackenridge on Tutuila.

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for thatching houses," as the stems in this humid climate are "not very sweet;" also seen naturalized. Tutuila.

(Imperata?; compare Pappophorum, and) sp. seen in Peru. A slender grass. Tutuila.

Coix lachryma, (No. 1). Upolu; introduced (by aboriginal settlers). A resident White proposed to cultivate this coarse grass for grain.

Paspalum; compare Taheitian sp.

Digitaria; bis, compare Taheiti. On Manua and Savaii.

——— (No. 2); compare D. sanguinalis. Upolu.

Eleusine Indica, (No. 1, bis Metia to Taheiti). On Manua, Tutuila, Upolu, and Savaii; doubtless introduced (by aboriginal settlers).

Rhapis acicularis, (No. 1, bis Taheiti). Savaii seemed in the same state of aboriginal cultivation as Taheiti is described to have been at the time of Cook's first visit; "the parts near the coast covered with cocoa-nut and bread-fruit trees, beneath which is very generally a green sward," seeming at first to "afford pasturage;" but on closer examination, the sward proved composed in great part of the pungent Rhapis acicularis.

Psilotum (triquetrum, bis No. 1 Paumotuan coral-islands to Taheiti). On Manua and Tutuila.

——— (complanatum, compare No. 2 Taheiti). "On Upolu," Rich.

Lycopodium; compare (No. 2) Taheiti; near L. phlegmaria. Savaii.

———; bis, apparently (No. 4) Taheiti. Habit of L. clavatum; spikes sessile. In a natural opening on exposed ridge in Tutuila, at the elevation of five hundred feet.

——— (No. 6); a sixth species. Epidendric; stem cylindr.; fr. axillary. Tutuila.

——— (No. 7); a seventh species. Epidendric; stem quadrangular, much resembling that of Andromeda tetragona, dichotomously branching; one or two terminal spikes. "Tutuila," Brackenridge.

(Selaginella, compare No. 1 Taheiti). Hypnoid, small. Manua; and seen by Mr. Brackenridge on Tutuila.

(——— Durvillæi, No. 2). Hypnoid, but upright, and twelve to eighteen inches high; spikes terminal. Tutuila and Savaii, abounding in the forest.

Trichomanes (alatum, No. 2). Nine inches high; stems fascicled and entwined; frond simply pinnate. In great profusion on the ground, in the forest of Interior Savaii; also on Tutuila.

——— (No. 3). A foot high, erect, multifid. Abundantly intermingled with the preceding, in the deep forest of Interior Savaii; also on Tutuila.

——— (No. 4). Two to three inches high, multifid. Creeping on trunks of trees, on Tutuila.

Hymenophyllum (No. 2); like Trichomanes, but bristles not seen. Erect, twelve to eighteen inches high, multifid. On the ground, in the deep forest of Interior Savaii.

Nov. gen. Dicksonioid; bis (No. 1) Taheiti. Frond simply pinn. On trunks of trees on the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet.

Dicksonia (No. 4); congen. N. American sp. Three to five feet high, 4-pinn., delicate; sori not marginal. Savaii.

——— (No. 5); like N. Am. sp.; long scattered hairs. "Tutuila," Brackenridge.

———? (No. 6); frond 4-pinnate, six to eight feet, spreading, and very large. Tutuila. Apparently the same species on Savaii, the frond 4-pinnate, the segm. lac., and the sori very small.

——— (No. 7); frond tripinn.; fr. in cup at base of dentic. Savaii.

———? (No. 8); like N. Am. sp., but fr. like margin. Asplenium. "Tutuila," Brackenridge.

Davallia; compare (No. 1 Metia to) Taheiti. On Manua and Tutuila.

——— (bis No. 2 Taheiti). On Manua.

(———? pectinata); bis?, apparently (No. 3) Taheiti. Epidendric; habit of Polypodium vulgare; lower segments of the frond pinnatifid. Tutuila.

Acrostichum aureum; bis (Brazil, and No. 2) Taheiti. On Tutuila, near the sea-shore; and in marshes on Savaii.

Schizæa (No. 2); near the Taheitian sp., but smaller. On mountain-ridges in Tutuila.

Adiantum? (No. 3); or perhaps Lindsæa. One to two feet high. On the mountain-ridge in Tutuila.

——— (No. 4). Twelve to eighteen inches high; a beautiful species, much divided. On mountains in Tutuila, at the elevation of a thousand feet.

——— (No. 5); frond simply pinnate, rooting at the apex. "Tutuila," Brackenridge.

———? (No. 6); frond slender, twelve to eighteen inches by an inch wide, simply pinnate. In the deep forest of Interior Savaii, rare.

Angiopteris evecta; apparently, bis (No. 1) Taheiti, being full as large. Frequent in the forest of Interior Savaii.

———? (No. 3); Marattioid. Cespitose, four to six feet high; frond simply pinn., with the term. segments alternate; the segments lanceolate, acuminate, penninerved; fr. not seen. Tutuila, growing on the ground in the forest.

Blechnum; apparently, bis (No. 1) Taheiti, but fructification descending nearer to the base of segments?. Tutuila and Savaii.

Gleichenia; bis (No. 1) Taheiti. But very rare; seen only on the crest of mountain-ridge in Tutuila, from the elevation of fifteen hundred feet to that of two thousand.

"Gymnogramma" (No. 1; compare Cheilanthoid of Taheiti). Eight inches high, under surface of the frond white. "Sea-rocks of Tutuila," Brackenridge.

Ophioglossum (pendulum); apparently, bis (No. 1) Taheiti. Pendulous from "trunks and branches of trees. Tutuila," Brackenridge.

——— (No. 2); of the usual habit. Growing on the ground, six to nine inches high; frond petioled, cordate-reniform. Tutuila, rare.

Antrophyum; compare (No. 1) Taheiti. Frequent on trunks of trees on Savaii.

——— (No. 2); possibly a second species. Frond lanceolate. "Upolu," Brackenridge.

"Niphobolus" (compare Taheiti). Creeping; frond lanceolate; sori few, in two rows at summit of frond. "Upolu," Brackenridge.

——— (No. 3). Creeping; sori very small and numerous. On trunks of trees on Tutuila.

Polypodium; compare (No. 1 Paumotuan and Bellinghausen) coral-islands. Manua.

———; compare (No. 4) Taheiti, and Aspid. Frond simply pinn., the stipe woolly. Frequent on Savaii, and on the other islands.

——— (No. 6). Much taller and narrower in proportion than coral-island sp., and not remarkably penninerved; sori irregularly distributed, and rather large. Savaii.

——— (No. 7). Small, six to nine inches; frond simply pinn. On trunks of trees on the mountain-ridge in Tutuila, at the elevation of eighteen hundred feet, rare. Our specimens of the fertile frond lost.

——— (No. 8). Four to six feet high; frond tripinnatisect, all connected except primary. In the forest of Interior Savaii.

——— (No. 9; compare Nephrodium). Habit of Aspid. exaltatum; the segments serrate; sori in two rows. "Upolu," Brackenridge.

Gen. Polypodioid (No. 2). A low tree-fern, only four to eight feet high; frond tripinn., the upper surface shining, ult. segm. sometimes auriculate, the stipe rough. On the mountain-ridge in Tutuila, at the elevation of fifteen hundred feet.

———; perhaps the same species; stipe pubescent or rough; segments ineq. and deeply-divided. In the forest of Interior Savaii.

"Microsorus" (No. 3). Habit of coral-island Polypod.; segments penninerved. Savaii.

———? (No. 4); frond bipinnatifid, the segments dent. Upolu, and frequent also on the other islands.

———? (No. 5). Eight inches; stipe pubescent. Manua.

(Cyathea? No. 1). A tree-fern, sometimes fifty feet high; frond tripinn., the segments broad, and crenulate; fr. in a sort of cup. Frequent on Savaii.

Vittaria; compare (No. 1) Taheiti; but the fronds not nearly as long. "Upolu," Rich.
Pteris (compare No. 1 Taheiti); like P. aquilina. Savaii.
——— (compare No. 2 Taheiti); near P. pedata. Only three to four inches high. Savaii; and apparently the same species on Manua.
——— (No. 4); habit of P. aquilina; frond very large, and much divided, the segments small. Manua.
———? (No. 5); frond very large, tripinn., the segments serrulate; no fr. Savaii.
——— (No. 6); frond bipinn., the segments linear. In the forest of Interior Savaii.
———; very large, and the segments large. "Sea-coast of Tutuila," Brackenridge.
——— (No. 7). Habit of Nephrodium exaltatum; a foot high; frond simply pinn. Among grass, in a natural opening at the elevation of five hundred feet on Tutuila, rare.
——— (Chinensis, No. 8). One to one and a half feet high; frond pinn., the segments appendiculate at base, the barren ones serrulate. Frequent in the lower portion of Upolu and of the other islands.
Polybotrya (No. 2); frond tripinn. "Upolu," Rich.
Thelypteris (No. 2); pubescent; sori of two sizes, the larger along the nervure of partial frond, the smaller along the nervures of the segments. Savaii.
——— (No. 3); sori all equal. Savaii.
——— (No. 4); sori very small. "Tutuila," Brackenridge.
(Nephrodium); compare (No. 1) Metia. Habit of Aspid. exaltatum; sori in two rows. Tutuila.
Aspidium? (No. 2). Scandent on trunks of trees; frond pinn., the segments trapezoid, obtuse. Savaii.
——— (No. 3); frond tripinn., multifid; the segments trapez., aristate. "Upolu," Brackenridge.
Diplazia (No. 2). Four to eight feet high, and often viviparous; frond simply pinn.; the segments serrate, penninerved, the fruct. diverging from each nerve. Frequent on Upolu and Savaii.
——— (No. 3). Six to eight feet high; frond tripinn. Frequent in the deep forest of Interior Savaii.
——— (No. 4). Very large; the frond bipinn.; the stipe prickly. "Upolu," Brackenridge.
———? (No. 5); frond bipinn.; the stipe hairy. "Upolu," Rich and Brackenridge.
Asplenium nidus; compare (No. 1 Paumotuan) coral-islands (to Taheiti). Frond simple. Manua and Savaii.
——— (No. 7); frond simply pinnate, lacerate; dent. ac. Upolu and Savaii.
———? (No. 8). Habit of A. trichomanes; eight to ten inches high. Savaii.
——— (No. 9). One to two feet high; frond tripinn., segm. lac., inequ. Apparently the same species, growing six to eight feet high. Savaii.
——— (No. 10); frond lanceolate, very long, rooting at the apex; fr. large; compare Scolopendrium. "Upolu," Rich and Brackenridge.
Nov. gen. Asplenioid?, (No. 1). Scandent, creeping about trunks of trees; fronds pinn., serrulate, penninerved; in the fertile frond, the fr. extends along nerv. to margin. In the forest of Interior Savaii.
———; perhaps distinct, growing on the ground; sori not seen. In company with the preceding, in the deep forest of Interior Savaii.

Nov. gen. Filic., (No. 1). Like tufts of young grass growing on trunks of trees; fronds two to three inches long, linear; fruct. all along the midrib. Savaii, and elsewhere.

Nov. gen. Filic. (dimorphous, No. 1). The barren fronds simple, ovate-lanceolate; the fertile fronds pinnately sinuato-dentate. Creeping on trunks of trees on Tutuila.

(Gen. Cryptog. incert., No. 1. Long, black, hair-like stems, like those afterwards met with in the Feejeean forest, "were seen on the Samoan Islands" by Mr. Rich).

Jungermania (No. 2).

Hypnum (compare No. 1 Taheiti); plumose. Creeping on trunks of trees, Tutuila.

———; apparently, bis (No. 2) Tillandsia-like of Taheiti. Rambling among the undergrowth in the deep forest of Interior Savaii.

Gen. Musc. with large capsule; apparently, bis (No. 1) Taheiti. In the deep forest of Interior Savaii.

Dicranum (No. 1); large, dendroid, or having the form of a miniature tree. Savaii.

Parmelia (No. 4); large and fine. On the bark of trees, Tutuila.

Boletus (No. 2); the pores exceedingly small. Incrusting trunks of trees on Tutuila.

——— (No. 3); the pores a little larger. Attached laterally to the trunks of trees on Tutuila.

Merulius? (No. 1). On trunks of trees on Upolu.

Agaricus (No. 2). Savaii.

——— (No. 3); small, red, convex, and plaited. The specimen placed in spirits.

(Peziza, No. 1). One to two inches; cup-shaped; substance thin. On the trunks of dead trees on Savaii.

Gen. Tremelloid (No. 1); retic. below. On dead trunks, in the forest of Interior Savaii. The specimen placed in spirits.

The preceding List will be found to include more than three hundred species of Ferns and Phænogamous plants indigenous on the Samoan Islands; so that the total number growing there can hardly be less than seventeen hundred. Of the above-enumerated species, several were shown by our subsequent observations to be peculiar; and even, some of the genera seem to be strictly Samoan.

In the afternoon of the 10th, the vessels of the squadron sailed from Apia, in the Samoan Group.

4. The Feejeean Island-region.

a. Uea, or Wallis Island.

Continuing Westward, the Vincennes, in the course of the morning of the 12th, arrived in sight of Uea or Wallis Island; presenting a novel combination of topographical features; that of a large coral-island having rocky islets in its lagoon. The extreme elevation of the cluster did not appear to exceed three hundred feet; the surface

of the principal islet very gently undulating; and the distance to the encircling coral-rim almost everywhere as much as two miles. One rocky islet was observed to be detached from the others, and situated just within the encircling coral-rim; an outlet or opening was found near, probably deep enough to admit large vessels, for a native in a canoe "offered to pilot us in." Notwithstanding the great numbers of *cocoa-palms* in sight, we were told, that there were but "few inhabitants," and among them "ten white men."

b. Hoorn Island.

Continuing Westward, the Vincennes early in the morning of the 13th, arrived in sight of Hoorn Island; situated very nearly in "S. lat. 15°" and in the antipodal longitude of 180°. The island consisted of a pointed mountain, "twenty-five hundred feet" high, and much resembled Manua; but was larger, and somewhat more broken, being fifteen miles long. *Cocoa-palms* were growing along the coast, and detached ones some distance inland, high up on the mountain-flank.

The succeeding day, as we had passed the 180th degree of longitude, was by a formal order called "Friday the 15th;" to conform to the Australian reckoning.

Keeping beyond the Feejeean Group of islands, and our course gradually inclining South, the Vincennes on the 18th, arrived in sight of Matthew's Rock; situated under the Tropic, and near the Southeast end of New Caledonia; and to be described presently.

Tropic-birds, Phaeton, continued around until the morning of the 21st; the ship soon passing into more Southern and cooler latitudes.

c. Eoa and Tongatabu.

Five months later the vessels of the squadron were returning North, towards the Tropic; and on the 19th of April, 1840, the Vincennes attained the "latitude of 26° 07′."

On the morning of the 22d, we arrived in sight of the island of Eoa. As the Vincennes drew near, the cliffs of the coast were observed to be often perpendicular, or even undermined at base, with

in some places a long line of beach in front; the land behind rising continuously, gently-swelling with some slight ledges, to the broad, rounded, ridge-like summit. Though the highest land in the scattered Tongan Group, "except, perhaps, the active volcano of Tofua," the extreme elevation proved only "six hundred feet." The component rock is doubtless volcanic; and, indeed, we heard afterwards of a kind of "sand procured on Eoa, that is useful for polishing." Arriving direct from New Zealand, we were chiefly impressed with the luxuriant freshness of the foliage: the larger portion of the surface being of a light green color, attributed to "clearings and yam-patches;" the strips and tracts of darker green, extending over the acclivities and shallow ravines near the coast, consisting probably of relics of the original forest-growth. Detached trees in the clearings, as well as we could make out with the glass, appeared to be *Casuarinas;* while *cocoa-palms* were readily recognized, some of them growing even on the higher portion of the island.

A channel "eight miles" wide, separates Eoa from TONGATABU; and we were baffled by the weather; heavy rain during the greater part of the day, with wind-squalls, thunder, and lightning. At length, on the 24th, the Vincennes was enabled to pass up this channel, and around the extreme point of Tongatabu: and thence, close along the shore to the anchorage; behind the outlying coral-reefs of the North side of the island. These coral-reefs are very extensive, and succeed each other in a series, the outermost being "nine miles from shore;" but rising to the surface only in spots crowned with forest-growth, they present the appearance of mere widely-scattered islets.

Tongatabu itself is only a coral-island; a flat expanse, twenty feet or so in average elevation, with here and there a coral knob or hillock, projecting as much more above the general level. Yet these knobs, examined to the depth of six feet or more, presented the component coral undisturbed, in the position of life. A wide, shallow inlet extends back several miles, to the centre of the island; but in place of any lagoon-like expansion, its low flat border is infiltrated for a long distance, by the rising tide. There are no water-courses; and the inhabitants derive their supply of fresh water by digging pits.

CLIMATE. As well as we could judge during a stay of only ten days, the climate seemed much the same as that of the Samoan Group; but the heat was more oppressive, calms more prevalent, and there was less rain; indeed, the only rain we experienced was that encountered

on our first approach. We learned that "hurricanes sometimes take place here, as well as at the other islands of the Group, and do a good deal of damage to the plantations." The West wind is well known; and from its inconstancy and short duration, is termed by the natives "the foolish wind."

The vegetable growth. This being a low coral-island, the coral-island plants were first looked for. They proved comparatively rare, and nowhere prominent, and after much searching, we could find only the following nine species: *Scævola*, growing along the sea-shore; *Guettarda speciosa*, also growing along the sea-shore; *Tournefortia argentea*, once only met with; *Cassyta*, not rare; *Euphorbia ramosissima*, frequent; *Pandanus utilis; Psilotum triquetrum*, rare; *Polypodium phymatodes?*, growing chiefly on the ground; and *Asplenium nidus*.

The island is covered with a thick coating of comminuted coral-soil, and the luxuriant vegetable growth includes a great variety of species. Yet there is a pervading coral-island character: shown by the scarcity of *Ferns*, even on trunks of trees, and of *epidendric plants* generally; there were no Peperomias, Lycopodiums, nor Hepaticæ; *Musci* or mosses, proved extremely rare, and *Tæniophyllum fasciola* was the only epidendric Orchideous plant. The absence of Freycinetias was striking; and *vines* of all kinds were decidedly less abundant, and less prominent than on the rocky islands.

The variation from the Samoan vegetable growth was principally negative; the List of missing Tribes requiring to be further extended by the following:

Ampelidaceæ,	the tribe Elatostemeæ,	Araceæ,
Melastomaceæ,	the genus Peperomia,	the genus Lycopodium,
Cyrtandraceæ,	Musaceæ,	(many genera of Ferns),
Acanthaceæ,	(Dioscoreaceæ),	Hepaticæ.
Scrophulariaceæ,	Palmaceæ,	
Aristolochiaceæ,	the genus Freycinetia,	

Some positive variation was, however, manifest: as in the presence of the genus *Smilax;* and on more thorough examination, the vegetable growth, instead of being Samoan, proved unequivocally Feejeean.

Following the Western margin of the lagoon-like inlet, after passing the half-wild plantations of the natives, I was surprised to find much of the original forest-growth remaining. Large, fully-developed trees were rare, having perhaps been removed by the natives: but of

medium-sized stocks, a large-leaved *gen. Myrtac.* was growing in great profusion; and a *Myristica*, here and there intermingled, was sometimes forty feet high with the trunk two feet in diameter. The most striking object was a rambling tree; a *Ficus*, having the trunk nine inches in diameter, branching, and the branches geniculating, proceeding a short distance upwards, then to the right, to the left, downwards, backwards, in short, assuming so many unexpected directions, as in the tangled forest to be traced with difficulty.

Continuing on, we entered a small savanna, or natural opening: closely resembling the one met with on Tutuila, devoid of trees and shrubs, and occupied by a dense growth of an herbaceous fern, *Thelypteris*, and intermingled grasses, as *Paspalum* and other genera; also some *Scirpeæ*, the pinnate *Pteris*, and certain ground Orchidaceæ, as *Bletia* and *Calanthe;* the only difference from the Tutuila savanna, consisting in a *Desmodium* now first making its appearance, together with an *Andropogon* among the grasses.

The natives being at war among themselves, our rambles on shore were very much restricted, confined to the immediate neighborhood of the anchorage; but I made one excursion in a canoe, to the heathen village of Mu, at the head of the lagoon-like inlet.

The following plants were found growing on Tongatabu:

(Stephania, bis No. 1 Taheiti to Samoa; recorded as) Cocculus?; no flowers. On the islet near the anchorage, rare.*

Thespesia populnea, bis (No. 1 Samoa). A tree, often a foot in diameter; smooth. Submaritime; abounding along the sea-shore.

(Paritium) tiliaceum, bis (Brazil, and No. 1 Metia to Samoa). Submaritime; abounding along the sea-shore, and forming tangled groves as on Taheiti.

(Heritiera, No. 1); gen. Sterculiac. A tortuous, spreading, arborescent shrub; leaves lanceolate, penninerved, the under surface silvery; axillary panicles; flowers unisexual;

* Anona (squamosa, bis Taheiti to Samoa). A tree, twenty feet high, with the trunk a foot in diameter; leaves broad-lanceolate, six to nine inches long; fruit smaller than in A. cherimoya, and the acini more separate. Introduced (by trading and colonial Whites).

Cardamine? sarmentosa, bis (No. 1 Metia to Samoa). Introduced (by aboriginal settlers), and growing around dwellings, rare.

Sinapis nigra, (bis United States, and No. 1 Europe). A weed around the Mission-houses; introduced by trading and colonial Whites.

Brassica oleracea, (bis Taheiti, United States, and No. 1 Europe); the cabbage. Cultivated; introduced by trading and colonial Whites.

calyx tomentose, 5-fid; fruit large, indehiscent; seed single, the cotyledons small, buried in pithy substance. Growing along the margin of the lagoon-like inlet, behind the mangroves, and above highwater mark.

Grewia mallococca, Forst. (No. 1). A small tree, twenty feet high, frequent. Compare G. tiliæfolia of Richard.

Gen. Sapot. (No. 2); Aegiceras-like. A shrub, twelve feet high, having the Terminalia mode of growth; leaves obovate, entire, one and a half inches long; sepals six, three outer ones and three inner; a long and persistent style. Near the margin of the lagoon-like inlet.

——— (No. 3); Achras-like. Leaves scattered, obovate, entire; larger than the last. Found by Mr. Rich.

(Gen. Olacac. ?), bis (No. 1) Samoa. Short spines; Diospyroid leaves; no flowers, nor fruit.

(Micromelum) minutum; bis (No. 1) Samoa A shrub, six to ten feet high. Frequent.

Calophyllum inophyllum, (bis No. 1 Metia to Samoa). Young stocks only.

(———); perhaps, bis (No. 2) Samoa. Rare; leaves obtained by Mr. Brackenridge.

(Gen. Sapindac. ?); bis (No. 1) Samoa. Terebinth. ?; stipules at base. Young stocks only.

(Xylocarpus, No. 1). A tree, twenty feet high; leaves pari pinnate, 2–3-jugis, smooth above, reticulate beneath; flowers not seen. Submaritime; growing along the margin of the lagoon.

——— (No. 2); a second species. A tree twenty feet high, branching from the base; leaves irregularly pari-pinnate, the petioles persisting; calyx 4-fid; petals four, the interior tube 8-dentate; stamens eight, style single; fruit of the size of an orange, with four large seeds. Growing along the margin of the lagoon, behind the mangroves and above highwater mark; abundant.

Gen. Pittosporac.? (No. 1). A tree, branching, twenty-five feet high; leaves scattered, entire; flowers numerous, small; calyx 5-fid; tube of the corolla of five weakly-united petals; berry of the size of a cherry, orange-colored, two-valved as in Geniostoma, the seeds numerous, imbedded in pulp.

Gen. (Pittospor. ?, No. 1). Habit of Cordia; ten to fifteen feet high; leaves scattered, obovate, entire; cymes; calyx 5-fid; five distinct petals; berry superior, of the size of a pea. Frequent.

——— (rapa, bis Taheiti, United States, and No. 2 Europe); the turnip. A weed around the Mission-houses; introduced by trading and colonial Whites.

Gossypium, bis (No. 1 Metia to Samoa). Growing around dwellings; introduced by aboriginal settlers.

Urena, bis (No. 1 Metia to Samoa). A frequent weed in cultivated ground; introduced by aboriginal settlers.

(Abelmoschus moschatus, No. 1, bis Taheiti to Samoa). In cultivated ground; introduced by aboriginal settlers.

Sida; bis ?, compare Samoa. One to one and a half feet high. In cultivated ground, not very frequent; introduced by aboriginal settlers.

Citrus decumana (No. 2); the shaddock. A tree, thirty feet high, with the trunk a foot or more in diameter; spines (on the young branches). Frequent; introduced by aboriginal settlers, and already here at the time of Cook's first visit.

——— (limonum, bis Taheiti to Samoa); the lime. Frequent; obtained from trading and colonial Whites.

Xylosma? (No. 2). A shrub or small tree; leaves alternate, broad; flowers dicœcious, inconspicuous, polyandrous; calyx 4-dent.; no corolla.

(Alphitonia, No. 2); Ceanothoid; a second species, a congener of the Samoan. A small tree; leaves lanceolate, the under surface white.

(Colubrina) Asiatica; bis (No. 1 Metia to Samoa). Frequent.

Rhus; apparently, bis (No. 2) Samoa. A spreading tree, forty feet high and upwards. Frequent.

Sophora; bis (No. 1) Taheiti. Submaritime, growing along the sea-shore.

(Dendrolobium), bis (No. 1) Samoa. A large shrub, with white flowers. Rare.

Desmodium (No. 4). Herbaceous, one to two feet high. Growing in the savanna or natural opening, rare.

Dolichos; bis (No. 1 Taheiti to) Samoa; yellow-flowered. Growing on the sands of the sea-shore.

(Mucuna); bis (No. 1 Taheiti to) Samoa. Frequent in the forest.

(Canavalia); bis (No. 1) Samoa. High-climbing; and the flower seeming larger and more elongate. Frequent in the forest.

(Kennedyoid, No. 1). A vine; leaves with silky pubescence, the leaflets rounded; not in flower.

Glycine? (No. 1). A woody vine; leaves impari-pinnate, bijugis; pods compressed, thin. Growing in the forest.

Guilandina (compare No. 2 Samoa). Prickles few; leaves when dry, shining on both sides. A long and straggling plant, climbing in woods along the sea-shore, and also some distance inland.

(Entada) scandens, bis (No. 1 Samoa). Seeds seen in the heathen village of Mu.

Acacia; bis (No. 1) Samoa; with broad phyllodia. Submaritime; frequent along the sea-shore.

Inocarpus edulis, (bis No. 1 Taheiti to Samoa). Frequent in the forest.

(Lumnitzera) coccinea, (No. 1); Laguncularia of authors. A many-stemmed or clustered shrub, twelve feet high, with ornamental flowers. Intermingled among the mangroves in the portion of the lagoon left bare by the falling tide.

Cardiospermum; bis (No. 1 Metia to Samoa). In cultivated ground, introduced by aboriginal settlers.

(Euphoria?, No. 1). A tree, thirty to forty feet high; leaves impari-pinnate, the leaflets in about nine pairs, sessile, penninerved; flowers not seen. Planted around dwellings; (having been introduced by aboriginal settlers).

Mallea Rohrii; bis (No. 1 Samoa); Melia baccifera of Rohr, see Voyage of the Astrolabe. A tree, twenty to thirty feet high, with the trunk a foot in diameter; capsule of three cells, each two-seeded. Planted in the village of Nukualofa.

Trichilia? (No. 1; simple leaved). Around dwellings, rare.

Oxalis (repens, bis Taheiti and Samoa); compare O. corniculata?. A weed around dwellings.

Gen. Terebinth.? (No. 2); apparently a second species. A congener of Samoan; less ferruginous; leaves impari-pinnate, the leaflets petioled; large compound racemes of small flowers. Planted around dwellings.

Terminalia; bis, compare (No. 2) Samoa. Leaves pubescent beneath; the fruit not margined. Submaritime; frequent along the sea-shore.

Rhizophora; bis (No. 1) Samoa; the mangrove. With exposed spreading interlaced roots, forming tangled beds in the portion of the lagoon within the tidal overflow.

———; possibly distinct; larger in all its parts; leaves having a soft mucro or point, which is easily deciduous.

Bruguiera; apparently, bis (No. 1) Samoa; but not becoming a tree. Intermingled with the mangroves in the portion of the lagoon within the tidal overflow; frequent.

Myrtus? (No. 3). Eight to ten feet high; leaves ovate, pointed; calyx 5-fid; pedicels solitary; berry of the size of a pea. Growing in the savanna or natural opening, and elsewhere.

Gen. Myrtac. (No. 1). Very large elliptical leaves; no flowers, nor fruit. Frequent in the forest; young stocks in company also frequent.

Cucumis; bis?, compare (No. 1 Metia to) Taheiti. Normal; flowers small, yellow; fruit small, and smooth. Growing around dwellings.

Portulaca (No. 4); apparently distinct from Samoan sp. Hairs at the base of the leaves; five large yellow petals. Near the sea-shore, rare.

Sesuvium (No. 1); compare Trianthema polyantha of the Voyage of the Astrolabe. Flowers purple; polyandrous. Along the margin of the lagoon, forming loose beds a foot high at about highwater mark; frequent.

Nov. gen. Cussonioid; bis (No. 1) Samoa. A shrub, six to fifteen feet high; leaves three to four feet long. In the forest, not infrequent.

Loranthus; compare (No. 2) Samoa.

Spondias dulcis, (bis No. 1 Metia to Samoa); the vi-plum. Introduced, a few trees planted in the village of Nukualofa.

Tephrosia piscatoria, (No. 1, bis Metia to Samoa). Growing as a weed; probably introduced by aboriginal settlers.

(Pachyrhizus? No. 1, compare Metia; recorded as) Phaseolus. Spoken of, as cultivated for the sake of its esculent tuberous root. Introduced by aboriginal settlers.

Erythrina (bis No. 1 Taheiti to Samoa). Planted in the villages; introduced by aboriginal settlers.

Abrus precatorius, (bis No. 1 Metia to Samoa). The flowers small, purple. Naturalized, growing often in wild situations in the forest; introduced by aboriginal settlers.

Poinciana pulcherrima, (bis Taheiti to Samoa). Flowers worn for ornament in the hair. Introduced by aboriginal settlers.

Cassia Occidentalis?, (bis Taheiti to Samoa), but woody. Planted in the village of Nukualofa.

Mimosa pudica; bis (Taheiti to Samoa), but in more flourishing beds. Introduced, a weed around dwellings.

(Serianthes myriadenia, No. 1, bis Taheiti); gen. Acacioid. Tamarind-like, but the seeds very small. A low spreading tree, twenty feet in height; petioles and mid-ribs hairy; leaflets smaller. Planted in the village of Nukualofa.

Terminalia (catappa, No. 4). A spreading tree, sometimes forty feet high; fruit margined. Planted; having been introduced by aboriginal settlers.

——— (No. 3); possibly distinct, the leaves broader. Growing on a tree top; the branch, shot down by Mr. Peale.

(Gen. Mussændoid, No. 3). A shrub, six to eight feet high; leaves penninerved; cyme or thyrsus of pisiform berries, which are not sulcate. Near the heathen village of Mu.

Guettarda speciosa; bis (No. 1 Paumotuan coral-islands to Samoa). Growing along the sea-shore, frequently met with.

Gen. Coffeoid (No. 4); near (No. 3) Samoa, but the fruit seeming smaller. In the forest.

Gen. Coffeac. with projecting calyx, (No. 1). A shrub, six to eight feet high; the large red fruit surmounted by a cup-like calyx, having four obsolete teeth; corolla tubular, 4-cleft.

Scævola; bis (No. 1 Paumotuan coral-islands to) Samoa. No flowers, nor fruit. Abounding along the sea-shore.

Mæsa?; compare (No. 1) Samoa. A shrub, six to eight feet high; leaves broad-ovate; calyx 5-fid, persistent, covering the capsule; style single. Rare.

Maba elliptica, Forster; compare (No. 1) Samoa. Ten to twenty feet high. Frequent.

Jasminum Australe, Forst. (No. 4); a fourth species. A frequent vine; leaves simple.

——— (No. 5); leaves trifoliolate; flowers and fruit not seen. On the islet near the anchorage.

Alyxia; bis (No. 5) Samoa. A shrub, sometimes subscandent; leaves in threes; the fruit, when fresh, not ribbed. Very abundant.

——— (No. 7); a seventh species. Near (No. 6) Samoa. Scandent, climbing over tall trees; stems whitish; leaves in threes; cotyledons plicate.

Hoya, bis (No. 3) Samoa. Frequent; the flowers not seen.

Barringtonia speciosa, (bis No. 1 Metia to Samoa). Only some young trees, planted in the village of Nukualofa.

Lagenaria vulgaris, (No. 1, bis Taheiti); the gourd. A small-fruited variety cultivated, and the shell used for holding cocoa-nut oil. Introduced by aboriginal settlers.

(Citrullus; bis Samoa, the United States, and No. 1 Tropical Africa); the water-melon. The fruit of good quality. Introduced by trading and colonial Whites.

Cucumis? (No. 2). A larger plant (than No. 1), and perhaps a different genus; leaves deeply lobed; flowers yellow; fruit oblong, smoothish. "Growing in cultivated ground at the heathen village," Rich.

Carica papaya, (bis Metia to Samoa, and No. 1 Tropical America). Abundantly cultivated, being a favorite fruit with the natives.

Portulaca oleracea?, (bis Taheiti, the United States and Peru). Growing around dwellings; introduced by trading and colonial Whites.

Hydrocotyle; apparently bis (No. 1) Samoa; but seeming larger and taller. Frequent.

Gardenia (Taitensis, bis No. 1 Taheiti to Samoa); the flowers seeming rather larger. Probably cultivated; found by Captain Wilkes.

Hedyotis paniculata, bis (No. 1) Samoa; compare Oldenlandia fœtida of Forster, but we did not perceive any marked odor in the flowers.

Morinda citrifolia, (bis No. 1 Paumotuan coral-islands to Samoa). Abundant.

(Wollastonia scabriuscula, bis No. 1 Samoa); Verbesina biflora of authors. Frequent.

Bidens; bis (Taheiti to Samoa); smoother than the New Zealand species; rays hardly distinguishable. Introduced by aboriginal settlers.

Cerbera (No. 3); a third species; compare C. manghas. The fruit seeming thicker and more obtuse; no white floral bracts. A small tree, abounding, especially along the sea-shore.

——— parviflora, Forst. (No. 4); a fourth species. Twenty feet high, the trunk rather slender; the leaves very large. On the islet near the anchorage, rare.

(Tabernæmontana, No. 1); Apocynoid. A shrub, six to eight feet high; leaves penni-nerved; flowers white, the corolla tubular; geminate orange-colored or yellow capsules; seeds in two bodies, five or six in each, enveloped in red pulp.

(Melodinus? No. 1). A vine; not in flower; leaves large, ovate, acute at each end, petioled.

Geniostoma (No. 4); perhaps, bis (No. 2) Samoa. A frequent shrub, six to ten feet high, with weak branches. Forster appears to have had this plant in mind when he gave the name of "Coprosma" to a Rubiaceous shrub. The odor of the flowers is very remarkable, and has proved the source of ludicrous mistakes.

(Labordia?, No. 3; compare No. 2 Samoa). A shrub or small tree, twenty feet high; large, smooth leaves, cushioned at base; a long, tubular corolla. In the forest.

(Ipomoea) turpethum?; bis (No. 1 Metia to Taheiti, and Otafuan and Phœnix coral-islands); leaves broad-cordate. Submaritime; growing along the sea-shore, and rather frequent.

(———) pes capræ?; bis (Brazil, and No. 2) Metia to Samoa. Frequent in maritime sands.

(Pharbitis? No. 1). Convolv.; leaves cordate, acuminate; flowers large, blue.

Nov. gen. aspera, bis (No. 3) Samoa; Cordia of Forster. Minute flowers.

Tournefortia (argentea, bis No. 1 Paumotuan coral-islands to Samoa). Growing along the sea-shore, once only met with.

Solanum; compare (No. 2) Samoa. Bearing red, Capsicum-like fruit. Growing along the sea-shore.

——— (No. 4); perhaps a distinct species. Leaves broad, with close pubescence on the nervures. Growing along the sea-shore.

Siegesbeckia (No. 1, bis Metia to Taheiti). Introduced by aboriginal settlers.

(Batatas, No. 1; compare B. edulis, Metia to Samoa). Habit of Calystegia sepium, but true Convolv.; leaves narrow-cordate; flowers purple. (Growing spontaneously).

Capsicum (frutescens, bis No. 4 Peru); flowers rather large. Introduced; growing in cultivated ground.

Nicotiana tabacum, (bis Metia to Samoa, and No. 6 North America). A few stocks cultivated; introduced by trading and colonial Whites.

Physalis (bis Taheiti to Samoa); smooth. Growing around dwellings; introduced by aboriginal settlers.

——— (edulis, bis Taheiti to Samoa, and compare No. 7 Chili, Peru, and) Cape-gooseberry. Growing around dwellings; introduced by aboriginal settlers.

Lycium (Barbarum). Introduced by trading and colonial Whites.

Leucas 10-dentatus, (No. 1, bis Metia to Samoa). Not very frequent; introduced by aboriginal settlers.

Gen. Labiat. (Teucrioid, No. 1). Calyx inflated, having five equal teeth; corolla not seen. Growing in cultivated ground.

(Premna?); compare (No. 1 Metia to) Samoa. Aegiphiloid; berry of the size of a small pea, superior, of four cells, each containing several seeds. Rare.

Clerodendrum inerme; bis (No. 1) Samoa, but seeming smoother. The long, weak stems forming tangled beds, and sometimes almost scandent.

Vitex; bis (No. 1) Samoa. Submaritime; growing on the sea-shore, once only met with.

Cassyta (bis No. 1 Paumotuan coral-islands to Samoa); but the "stems seeming stouter," according to Mr. Brackenridge.

Myristica (No. 3). Leaves large, the under surface glaucous and smoother than in the Samoan species; also a larger tree, being sometimes forty feet high, with the trunk eighteen inches to two feet in diameter; the branches in like manner given off in whorls at regular intervals.

Dais?; bis (No. 1) Samoa. Growing near the sea-shore.

Daphne; compare (No. 1 Taheiti to) Samoa. Broad-leaved. Growing along the sea-shore, rare.

Hernandia sonora; bis (No. 1 Samoa, see also Otafuan coral-islands). Seen only in the young state, growing on the sea-shore.

——— ovigera? (No. 3; compare No. 2 Samoa). Leaves ovate, inequal at base. Found by Mr. Brackenridge; rare.

Euphorbia ramosissima; bis (No. 1 Paumotuan coral-islands to Samoa). Frequent.

Nov. gen. (Tanarius, bis No. 1 Taheiti to Samoa); Ricinus of authors. Sometimes becoming a tree, twenty feet high with the trunk a foot in diameter. Growing around plantations.

(Omalanthus? No. 4); perhaps a distinct species, the capsule being very constantly three-celled. Ten to fifteen feet high; flowers monoecious, or sometimes dioecious. Growing near cultivated ground.

(Glochidium); bis, apparently (No. 3) Samoa. On the islet near the anchorage, rare.

(Excæcaria, No. 1); Hippomanoid. A branching tree, twenty to twenty-five feet high, with the trunk a foot in diameter; flowers in inconspicuous spikes; fruit small, tricoccous. Submaritime, and abundant.

(Stachytarpha, compare No. 1 Rio Janeiro. Planted; having been introduced by trading and colonial Whites).

Boerhaavia; bis (No. 3 Metia to) Samoa. Sands near the sea-shore, rare.

Achyranthes; bis? (No. 2 Metia to) Samoa; the florets green or whitish. Frequent.

Amaranthus cruentus? (No. 2); florets red. A weed in cultivated ground; introduced by aboriginal settlers.

Aleurites triloba, (bis No. 1 Metia to Samoa); young stocks only. Introduced by aboriginal settlers.

Codiæum variegatum, (No. 1, bis Samoa). Found by Mr. Rich. Introduced by aboriginal settlers.

Acalypha; bis? (No. 1) Samoa; but leaves seemed smaller. A frequent weed in cultivated ground; (introduced by aboriginal settlers).

(Gen. Urticac. with Sterculoid leaves, No. 1). A tree, twenty feet high; leaves ovate, or sometimes three-lobed?, the lowest pair of nervures marginal at the commencement; no flowers, nor fruit. Planted in the village of Nukualofa; having been introduced by aboriginal settlers. (Afterwards seen indigenous on the Feejee Islands).

(Gen. Morus-like; recorded as) Procris?; bis (No. 1) Samoa.

Celtis (No. 3); the leaves seeming broader than in the Samoan sp.

Ficus turbinata, Forst.; compare (No. 6) Samoa. A small tree, twenty feet high; leaves rough, inequ. at base; fruit stipitate, yellow toment. Young stems also fruiting.

——— (compare No. 7 Samoa). The solitary large tree, figured in the Voyage of the Astrolabe, and growing near the heathen village of Mu. The so-called "trunk of a hundred feet in circumference" is rather an enormous congeries of roots, entwined and anastomosing, leaving vacant spaces, with at one or two points unobstructed vision through the whole mass; some of the huge, wide-spreading arms are very lofty, and in the absence of a standard of comparison, the extreme height seemed hardly less than eighty feet. The leaves oblong-ovate, much resembling those of the pear-tree, but entire; the fruit having a three-leaved involucre.

——— (No. 9). A tree, according to the size of the trunk, but remarkable for its rambling habit of growth; leaves inequ. at base, smooth.

Piper; compare (No. 4) Samoa. Four to five feet high; leaves broad, 7-ribbed, acuminate. Frequent in the forest.

Gen. incert. (No. 1). A tree; leaves alternate, elliptical, entire, inequ., almost trinerved; small axillary racemes; fruit young, a berry?. Rare.

(Halophila ovata, bis No. 1 Samoa). Marine; growing in sea-water on the overflowed coral-shelf; and even brought up on the anchor from the depth of eleven fathoms.

Nov. gen. Zosteroid, (No. 1). Stem or rhizoma creeping; leaves cylindrical, sheathing at base, six to nine inches long; no flowers, nor fruit. Marine; growing in sea-water on the overflowed coral-shelf, frequent.

Pterocheilus?; compare (No. 1) Samoa; leaves inequal. In the forest, rare.

(Nervilia); bis, apparently (No. 1) Samoa. Cordate leaves. In the forest, rare.

Broussonetia; bis (No. 1, Metia to Samoa). The variety with divided, or rather dissected leaves. Cultivated for making "tapa" or bark-cloth; having been introduced by aboriginal settlers.

Artocarpus incisa, (No. 1, bis Metia to Samoa); the incised-leaved variety. Cultivated, but not abundant.

Ficus (bis No. 8 Samoa). A tree, with the trunk and branches whitish; the trunk very large, giving out horizontal, wide-spreading arms, but the total height not exceeding fifty feet; leaves broad-lanceolate; fruit sessile, orange-colored, pisiform. One of these trees conspicuous, half-way between Nukualofa and the entrance to the lagoon.

Piper (methysticum, bis No. 6 Samoa); the cava-pepper. The roots and stout stems only.

Casuarina equisetifolia, (No. 1, bis Metia to Samoa). Planted in and around the village of Nukualofa; (having been introduced by aboriginal settlers).

Cycas circinalis, (No. 1). Twelve feet high, with the trunk nine inches in diameter. Growing in wild situations, and also planted in the village of Nukualofa; (brought, probably from the Feejee Islands, by aboriginal settlers).

Canna (Indica, bis Taheiti to Samoa, and No. 1 Brazil and Peru). Only seen cultivated; having been introduced by aboriginal settlers.

Zingiber (zerumbet; No. 1, bis Samoa). A foot high. Growing near cultivated ground, and rather rare.

Curcuma (No. 1, bis Taheiti to Samoa). "Turmeric" said to be here.

Bletia?; bis (No. 1) Samoa. Growing in the above-described savanna, or natural opening.

Calanthe; bis (No. 1) Samoa. Capsule very large. Growing in the above-described savanna, and elsewhere.

(Tacniophyllum) fasciola; compare (No. 1 Taheiti to) Samoa; but the flowers seemed larger. On trunks of trees, not very abundant.

Gen. Orchioid with nodding raceme, (No. 1). One to two feet high; leaves large; flowers purple; capsule large.

Gen. Orchioid. with axillary racemes, (No. 1). Two to three feet high; compound panicled axillary racemes of slender, white, nodding flowers.

Dendrobium-like but terrestrial, (No. 1). One to two feet high; leaf-stalk bulbous at base; the flower-stem separate. In the forest, rare.

Dianella; compare (No. 1) Taheiti. Growing near the sea-shore, frequent.

Smilax (No. 1); normal. In the deep forest, rare.

Scleria; bis (No. 3) Samoa. Four to six feet high. Growing in the vicinity of the above-described savanna.

Fimbristylis (No. 3); a third species; compare F. complanata, Vahl. Flat-leaved; one to one and a half feet high, stem sulcate. In the savanna.

Trichelostylis (No. 1); Scirpus of authors. Habit of S. autumnalis; a foot high; radical flat leaves; stem alate or ancipital; panicle lateral. Growing in tufts in the savanna.

(Abilgaardioid, No. 1). Habit of Eleocharis tuberculosa, but leafy at base; spike compressed or spiral. Abounding in the savanna.

Gen. Paniceæ?; bis (No. 1 Samoa). Creeping in maritime sands, frequent.

Paspalum; compare (No. 1) Taheiti. Smooth in all its parts. Abounding in the savanna.

Lepturus (repens, Lesson; No. 2, compare Paumotuan and Phœnix coral-islands, and Samoa). In sands along the sea-shore, rare.

"Phrynium;" large, broad leaf. "Growing near cultivated ground," Rich. (Introduced by trading and colonial Whites).

Musa paradisica, (No. 1, bis Metia to Samoa). Cultivated, but not abundant; introduced by aboriginal settlers. Young stocks only met with, and ripe fruit extremely rare. The island, however, is rather famed for bananas; and the natives appeared to be very discriminating in selecting the soil best adapted to their cultivation.

Crinum (compare No. 1 Samoa). In cultivated ground. Mr. Brackenridge thought it differed from the species seen on Manua.

Dioscorea; bis (No. 1 Metia to) Samoa. Broad-leaved; the roots "bitter," and not edible. Frequent in cultivated ground.

——— alata; bis (No. 4 Samoa). Seeming the most important article of food, and therefore abundantly cultivated at no great distance; (probably, as above intimated, on the neighboring island of Eoa). Introduced by aboriginal settlers.

Tacca (No. 1, bis Metia to Samoa). In cultivated ground, but not seen planted; introduced by aboriginal settlers.

Dracæna terminalis, (No. 1, bis Metia to Samoa). In cultivated ground, but not seen planted; introduced by aboriginal settlers.

Cocos nucifera, (bis Paumotuan coral-islands to Samoa and Hoorn Island). So abundantly cultivated, that from the sea the whole island seemed to be a grove of cocoa-palms. Introduced by aboriginal settlers.

Orthopogon; compare (No. 1 Taheiti to) Samoa. In cultivated ground, frequent.

——— (No. 2); a second species. Much larger, hairy. Frequent in cultivated ground.

Cynodon (bis No. 1 Taheiti to Samoa). Frequent in maritime sands.

Andropogon (No. 1); the stem branching. Growing in large tufts in the savanna.

Psilotum (triquetrum; bis No. 1 Paumotuan coral-islands to Samoa). On trunks of trees, rare.

Davallia; bis, compare (No. 1 Metia to Samoa). On "root of cocoa-palm," Brackenridge; rare.

Acrostichum aureum; bis (Brazil, and No. 2 Taheiti to Samoa). Abounding on the flat infiltrated margin of the Lagoon, growing in large tufts.

Polypodium phymatodes?; compare (No. 1 Paumotuan coral-islands to Samoa). Rather frequent, chiefly growing on the ground.

Pteris; bis, compare (No. 7) Samoa. Habit of Stegania; frond simply pinnate. Frequent in the savanna.

Thelypteris; compare Samoan sp. Pubescent stipe; frond larger, and the sori larger than in the next species. The most abundant fern, especially in the savanna.

——— (No. 5); a species here first met with. Frond narrow, pinn., the segments dentate; sori very minute. In the savanna, rare, found by Mr. Brackenridge.

(Nephrodium); bis (No. 1 Metia to Samoa), and compare N. exaltatum. The rachis pubescent. Occasionally met with in the forest.

Asplenium nidus; bis (No 1 Paumotuan coral-islands to Samoa). Not infrequent.

(Borassus flabelliformis; No. 1, bis Samoa). Frond only four to five feet in diameter, and the petiole smooth; flowers bisexual; calyx monophyl., corolla of three petals. Planted; having been introduced by aboriginal settlers.

Pandanus (bis No. 1 Paumotuan coral-islands to Samoa). Cultivated; having been introduced by aboriginal settlers.

(Colocasia) macrorhiza, (No. 1, bis Metia to Samoa). Cultivated; having been introduced by aboriginal settlers.

Cyperus; bis? (No. 1 Metia to) Samoa. Glaucous. Growing near the sea-shore.

Panicum; bis? (No. 2) Samoa. Small, smooth. Growing in cultivated ground.

———? (No. 3). Large, the leaves hairy. In cultivated ground, frequent.

Saccharum officinale, (No. 1, bis Metia to Samoa). Abundantly cultivated. The slender-stemmed variety that grows in wild situations, woven into wicker fences and partitions. The plant introduced by aboriginal settlers.

Coix lachryma, (No. 1, bis Samoa). In cultivated ground; introduced by aboriginal settlers.

Digitaria (compare No. 2 Taheiti to Samoa); seeming less hairy than D. sanguinalis. Abounding in cultivated ground; having been introduced by aboriginal settlers.

——— (ciliaris, No. 3); seeming a distinct species; more hairy.

Eleusine Indica, (No. 1, bis Metia to Samoa). Abounding everywhere; having been introduced by aboriginal settlers.

Rhapis acicularis, (No. 1, bis Taheiti to Samoa). Rare; introduced? by aboriginal settlers.

Cenchrus calyculatus, (No. 1, bis Metia to Taheiti).

———; bis?, (compare No. 5 Taheiti). Habit of A. serra; and a foot high. "On the fort," (a coral-knob in the) village of Nukualofa, rare, Brackenridge.
Orthotrichum? (No. 1). Intermingled with epiphyte on bark of trees, rare.
Gen. Musc. incert, (No. 1). Rare.
Parmelia (compare No. 2 Taheiti); a grey species. Growing on the bark of trees.
Usnea; compare (No. 1 Taheiti and) U. florida. Growing on branches of trees near the sea-shore.
——— (No. 2); mixed yellow and grey. Frequent on branches of trees near the sea-shore.
Ramalina (compare No. 1 Paumotuan coral-islands to Taheiti). Abounding on branches of trees near the sea-shore.
Agaricus (No. 4); a very large species.
——— (No. 5); a second species; and of medium size.
Lycoperdon (No. 1); the surface papillose.
Gen. Tremelloid?; bis (No. 1 Samoa); large, lobulated, blackish above.

Notwithstanding that Tongatabu has been so often visited, the above imperfect account of the vegetable growth may yet prove the fullest that has hitherto appeared. The Flora printed in the Voyage of the Astrolabe was examined on the spot, and seemed to contain only the four following additional species:

"Euodia hortensis." Quoted as found here by Forster.
"Oldenlandia debilis." Quoted as found here by Forster.
"Mussænda frondosa," and
"Solanum nigrum."

On the 1st of May, there was a fine breeze throughout the day; but the ensuing night, like most of those we passed here, was calm and oppressive.

The calm continued in the morning and throughout the forenoon of the 2d; but at 2 P. M., the Vincennes was enabled to leave the anchorage; just as the Peacock came in sight. After a short delay, the Vincennes proceeded directly away from the land for "about nine miles;" and anchored close within the outermost coral-reef.

The 3d was calm, and the ship remained at anchor.

On the morning of the 4th, the Vincennes sailed through the opening in the outermost coral-reef; being now provided with a pilot for the Feejee Islands.

d. The Feejee Islands.

Having gained the open sea, the Vincennes sailed Northwest; and at sunset on the 5th, arrived in sight of TURTLE ISLAND; high and rocky, but of small size, and unimportant, except as a guide to the navigator.

Lying-by under a fresh breeze, the ship drifted "about thirty miles" during the night; so that on the morning of the 6th, we were fairly among the scattered outermost islands of the Feejeean Group. Those in sight were widely apart, small, of moderate elevation, and undulating in outline. One of them, a little larger than the others, was called OOLONG by our pilot; who stated, that it was "destitute of yams, though permanently inhabited," and that "canoes were built there of a kind of wood resembling teak."

Changing our course and proceeding Southwest, the Vincennes towards sunset passed ONGEA; an island of the same general character with those last-mentioned, but more elevated. A little beyond, we passed another island, bearing the same general resemblance in outline. The wind had by this time increased almost to a gale, with thick weather; but there being some clear space ahead, we continued sailing, until about 3 A. M.

On the 7th, the Vincennes reached the island of OVOLAU; but too late, with the adverse wind, to attempt the passage through the coral-reef. Though somewhat larger than the islands as yet seen in the group, Ovolau is of limited extent; and derives its importance chiefly from its central and intervening position, as a rendezvous for traders. The land presented much of the aspect of Taheiti; being "2070 feet" in extreme elevation, broken and mountainous, variously tinted by exposed precipitous rocks, luxuriant forest, and pale-green ridges bare of trees, like a glowing beautiful picture.

On the 8th, the Vincennes was towed through the opening in the coral-reef, to the anchorage before the village of Levuka.—On the 9th, I accompanied Captain Wilkes and others to the nearest mountain-summit, to obtain a general view of the whole Group. The weather being clear, the two main islands were in plain sight; one to the right, and the other to the left; each containing several thousand square miles of land, and full of mountains; some of those far inland seeming as much as four thousand feet in elevation. The lesser

islands, scattered at all distances, were also mountainous; though very few of them exceeding the elevation of fifteen hundred feet. But the usual estimate of "three hundred islands" in the Group, seemed already, and was subsequently ascertained to be too large.

Geological structure. *Conglomerate* or pebble-rock prevailed throughout the Feejeean Group; passing occasionally, and more or less completely into *basalt.* The land-surface besides, even where comparatively level, was very generally strewed with blocks of basalt; and one boulder observed in the distance near Naloa, seemed as much as thirty feet in the longest diameter. A quarry of columnar basalt, in the same vicinity, was visited; but I was surprised at nowhere meeting with a decided example of vesicular lava.

Oneata, one of the small islands in the Eastern portion of the group, appears to contain an active volcano; for Dr. Holmes, on landing, found "the surface overspread with recent lava and scoria," or with *lava-streams.* At Savu-Savu, a *hot-spring* was visited by a party from the Vincennes. And according to resident Whites, *earthquakes* are frequent in the Feejeean Group; none however were experienced by ourselves.

Climate. In the deposition of moisture, there is a difference between the Windward and Leeward portions of the Group. At Ovolau, on the Windward side, the climate seemed almost as rainy as that of the Samoan Islands: while during eleven weeks spent in the Leeward portion of the group, our party experienced no rain; except precisely in the exposed channel between the two main islands.

At no time did we find the heat oppressive; but we were once more told, that we had arrived in the "cool season." *Gales* are sometimes severe enough to wreck vessels in situations that appear safe, entirely sheltered behind coral-reefs. One of these gales took place shortly before our arrival; and according to Captain Eagleston, "commenced on the 25th of February,* and lasted four days; beginning from the Eastward, getting round to the Westward, and blowing harder from the Northwest than from any other quarter; following the same order

* This may have been the gale experienced by ourselves at the Bay of Islands in New Zealand; where, after a steady rain during the daytime of the 29th of February, the gale commenced from the Eastward at night; but before daylight shifting to the Westward, proved "the heaviest known there during the residence of the missionaries, with the exception, perhaps, of one that took place a short time after their first arrival."

as all the gales he has experienced at these islands" during his several visits.

Some remarks and direct observations on the distinction of seasons will be given presently, in the description of the vegetable growth.

Windward portion of the group. We entered the Group from the Windward; and in conformity with the mountainous surface and rainy climate, the vegetable growth on Ovolau proved richer and more varied than at any other station we visited. The change from the Samoan Islands was marked by the greater variety and abundance of Euphorbiaceous shrubs, particularly, species of *Acalypha;* by the shining, or even highly polished leaves of many kinds of plants; by *climbing Melastomaceæ* making their first appearance; as also, the strange, mistletoe-like *Myrmecodia;* the nests of a *Polypodioid fern*, conspicuous in the tree-tops from the accessory scarious fronds; the *Pittosporaceæ; Lauraceæ*, and the genus *Cinnamomum;* species of *Caryophyllus* or wild clove; and by *Leguminosæ* having become abundant: the vegetable growth being made up of an increased number of species, yet there was less luxuriance, and large forest-trees were comparatively rare.

In our progress Westward, we had at length arrived at a point where the vegetable growth is less exclusively Polynesian, and partakes of the East Indian, and especially of the Moluccan character; in conformity with climate and geographical proximity.

The forest on Ovolau was composed of a great variety of trees: including several species of *Ficus*, extremely abundant, but rarely exceeding the medium size; also, pinnate-leaved trees, some of them large, belonging to *Meliaceæ*, *Terebinthaceæ*, but perhaps chiefly to *Sapindaceæ;* several *Myrtaceous* trees; an ornamental *Apocyneous* tree, fifty to sixty feet high; a spreading *Inga-like* tree, of equal dimensions, but not extending far inland; *Calophyllum*, perhaps a third species; a *Myristica* frequent, and very generally diffused through the forest; an *Antiaris*, forty feet in height; an *Epicarpurus*, sixty to seventy feet high; a *Firmiana;* a *gen. Tiliac.*, having a thin, flattened capsule; an *Uvaria;* several undetermined trees seen only in leaf; and especially a *gen. Cunoniac.*, with ternate leaves and showy flowers, conspicuous in exposed situations along the margin of the forest; accompanied by a *gen. Ceanothoid*, sometimes thirty feet high.

True *parasitic plants*, the *Loranthaceæ*, continued somewhat rare. The *Myrmecodia*, which is abundant, might indeed be mistaken for one, but it has roots, and is therefore only epidendric. In the tree-

tops, nests of a *Hamelinia*, an epidendric Melanthaceous plant, were sometimes seen; though far less frequent than the conspicuous nests of the *Polypodioid* fern above mentioned. Other *epidendric ferns*, growing lower down on the branches and trunks of trees, were as abundant and in greater variety than on the more Eastern Groups. *Epidendric Orchidaceæ*, were also in greater variety; the species being more local, changing from Group to Group, more than in other tribes of plants. *Epidendric Lycopodiaceæ* were abundant; and *Peperomias*, here and there present, though nowhere prominent. Of other plants *investing* trunks of trees; two or more species of *Pothos* were occasionally intermingled; and more rarely, the *Robiquetia*, a scandent Orchidaceous plant; while conspicuous above all the rest, *Freycinetias* in the greatest profusion invested trunks, and ascended beyond, high along the branches.

Vines, though not so conspicuously abundant as in the Samoan forest, were yet in great variety: including a *Mucuna;* a climbing *Piper*, nowhere very prominent in the forest; one or two species of *Hoya*, less abundant than at Samoa; some climbing *Apocynaceæ;* a scandent *Rubus*, having the New Zealand habit; two or more species of *Cissus;* two species of *Jasminum;* a pinnate-leaved *gen. Sapindoid;* two or three species of *Smilax*, rather frequent; three or more scandent *Morindas;* a white-berried *Coffeaceous* plant, with a long, creeping stem, ascending and adhering to trunks of trees; and especially, a lofty-climbing *Melastomaceous* plant, putting forth from the old wood large panicles of white, wax-like flowers.—Herbaceous vines, as various *Phaseoleæ*, *Convolvuli*, and *Dioscoreas*, were chiefly confined to exposed situations; to the border of the forest, and the vicinity of the sea-shore.

Palms were here and there met with in the forest; being more frequent than on the Samoan Group, and in more variety; but none of the species lofty. *Tree-ferns* were by no means rare.

The forest was full of a great variety of shrubs, many of them arborescent: as a *Dillenia*, twenty feet high, conspicuous from its large white flowers; a *Grewia*, of equal dimensions, everywhere abundant; pinnate-leaved *Araliaceæ*, and also digitate-leaved species; *Urticeous* shrubs, some of them arborescent, but not so abundant as on Taheiti; a profusion of *Coffeaceæ*, some of them rather showy, and including several genera that were new to me; a *Leea*, everywhere frequent, having the character of an upright, rigid vine, four to ten feet high;

a *Piper*, rather frequent; various shrubby *Acalyphas*, with two or three *Glochidiums*, and other woody *Euphorbiaceæ;* several *Pittosporeæ*, rather frequent, and some of the species large and almost arborescent; a *Cleyera?*, a large and ornamental shrub, chiefly growing along the banks of streamlets; *gen. Chloranthoid*, arborescent, being sometimes twenty feet high; several large and ornamental *Thymelaceous* shrubs; *Maba*, two or more species becoming small trees; *Cordia? aspera*, already seen on the Samoan Group; an *Uvaria?* with subsessile fruit; an *Acronychia*, large and arborescent; *Mœsa*, two or three species; *gen. Simarub.;* a *Labordia*, sometimes twenty feet high; *gen. Ficus-like*, with ribbed or plicate fruit; and especially, species of *Caryophyllus* or wild clove, one of them arborescent, and another, tall, weak-stemmed, and almost vine-like. But the most frequent shrub, in the forest, along its border, and in open situations, was *Micromelum minutum*, already seen on the Samoan Group; a shrubby species of *Ficus* also abounded in open situations; accompanied by a frequent showy-flowered, shrubby *Cassia;* one or two *Scævolas*, rare; and a few shrubby *Melastomaceæ*.

Of Musaceæ and Scitaminaceæ, large herbaceous plants: the *gen. Heliconioid*, already seen on the Samoan Group, was growing clearly indigenous in the mountain-forest; where, also, a tall *Hedychium-like Amomum?* formed conspicuous tufts and patches, ten to fifteen feet high.

Beneath the shade of the forest, the space between the trees and shrubs was chiefly occupied with large *Ferns*, especially abounding in elevated and somewhat moist situations; but species of *Elatostema* were frequent, here and there intermingled; as also, three or four *Ophiorhizas* and other low *sub-herbaceous Coffeaceæ*, very generally diffused and rather ornamental, with small foliage, and neat, white, tubular flowers; also *ground Orchidaceæ*, hardly as frequent and various as on the Samoan Group; and tufts of a *nov. gen. Carex-like* abundantly scattered through the forest.—Again, beneath the large Ferns and other herbaceous plants, was a luxuriant coating of diminutive Cryptogamous plants: consisting of numerous species of *Trichomanes* and *Hymenophyllum;* two or three Hypnoid or moss-like *Lycopodiums;* and a variety of *Hepaticæ* and real *Mosses*. In elevated situations, the Fungus-like *Balanophora*, light-avoiding and etioled or blanched, was rather frequent, parasitic at the base of forest-trees on the roots.

At the elevation of two thousand feet upon one of the MOUN-

TAIN-CRESTS ON OVOLAU, I was strongly reminded of similar situations in Tutuila and Taheiti: by a scarlet-flowered *Metrosideros* growing around; in company with a Myricoid *Myrsine*, an *Alstonia*, a simple-leaved *Weinmannia*, a *Eurya?*, some *Melastomaceæ*, and an increased variety of *epidendric Ferns* and *epidendric Orchidaceæ*. On the other hand; one of the *Melastomaceæ* was vine-like, ascending twenty to thirty feet, with red terminal flowers; and other mountain plants now made their first appearance: as a Spiræa-like *gen. Zanthoxyl.?* having simple, verticillate leaves; *Calophyllum?* twenty feet high; a panicled *Myrsine?*; one or more species of *Laurus;* a *Cinnamomum;* a tree species of *Caryophyllus*, with flower-buds closely resembling cloves, but destitute of flavor; and for the first time an East Indian fern, the remarkable flabellate *Polypodium? Wallichii;* accompanied by a congener of the New Zealand *Podocarpoid*, an arborescent shrub, with the leaves lanceolate, but destitute of lateral nervures.

On the 15th, I parted from Mr. Brackenridge, and went on board the Peacock; which ship sailed about noon, proceeding Westward along the neighboring coast of Viti-levu, the largest of the two main islands.

On the 16th, the Peacock entered an opening in the coral-reef, and anchored in the Southern branch of the estuary that flows by the town of Rewa.

On the 17th, I landed with others on NUKULAU; a flat coral-islet, or rather expanse, being not entirely disconnected from the outside coral-reef. The surface was covered with trees; the species being few in number, and chiefly such as occur in submaritime situations on other Polynesian Groups: a large *Amerimnoid* tree was however met with; and a fine example of the gigantic *Ficus* seen on Tongatabu, its trunk consisting in like manner of a congeries of roots.

Towards sunset on the 18th, embarking with others in the missionary-canoe, I proceeded "six miles" up the estuary to the town of REWA. The environs in all directions are flat and alluvial, and in times of freshets, are said to be extensively inundated by river-water coming from the Interior.—On the 19th, Mr. Rich and myself, with a Feejee guide and several Tonga men, crossed in a canoe the main channel; here nearly a fourth of a mile wide, and quite river-like, the water being fresh to the taste, with the current constantly onward; but the tide continues to rise and fall, the fishes and aquatic animals are with one or two exceptions marine, and the *mangroves* had not

entirely disappeared. Entering and ascending a tributary creek, we left the canoe at the head of tide, beyond which point we saw no more mangroves: but wading in the muddy bed of the stream, the view continued hemmed in by tall tufts of *Acrostichum aureum*, and the overhanging summits of low, submaritime trees: as *Barringtonia acutangula* abounding, associated with *Xylocarpus*, the small-leaved *Erythrina?*, the Tamarindus-like *Acacioid*, and a *gen. Semecarpoid;* their branches and summits tangled by vines, as a remarkable, Lomaria-like *twining fern*, two woody-stemmed species of *Glycine?*, and towards the inland margin, the *Entada scandens*, with its giant pods here and there pendent in the tree-tops: an epidendric *Dendrobium?*, remarkable for its singularly-flattened gladiate stem, seemed at home, and was met with only in this submaritime grove; while in the open marsh outside, a *nov. gen. Pandan.?* made its appearance, at a little distance, mistaken for tufts of a gigantic, short-stemmed Cyperus. After reaching the fast ground, we left the bed of the stream, and proceeded through a level country that had been long cleared and cultivated, the path at the end of some three miles leading to a trifling patch of woods; we remained here a short time, but meeting with little novelty, and seeing nothing inviting beyond, we finally complied with the wishes of our guides, who were anxious to return.—On the 20th, Mr. Rich and myself set out on an excursion back of Rewa, threading our way amid an endless maze of taro-ponds and scattered dwellings. There being no prospect of getting beyond them, and coming upon the North branch of the estuary, we took a canoe for a mile further, and landed on the opposite bank; where we found ourselves in another endless maze of taro-ponds entirely similar to the first; we, therefore, returned all the way by water, and arrived at Rewa about noon. In the afternoon, our party proceeded down the estuary, and with all the boats, returned to the Peacock.

On the 23d, the Peacock returned through the coral-reef, and left the coast of Viti-levu for KANTAVU; a large island in sight, "twenty-five miles" long, having at one end a conspicuous mountain-peak. The wind continued very light; but on the 24th, we were near enough to distinguish trees with the glass. The 25th being entirely calm, our projected visit was abandoned. Dr. Fox, with a party from the Vincennes, subsequently visited this mountainous and fertile

island; and described it, as "covered with woods on all sides," and as "reported to contain forty towns."

On the 26th, returning towards Viti-levu with a fine breeze, the Peacock passed VATU-LELE; an elevated coral-island, already alluded to in the account of Metia. It is situated on the outskirts of the Feejeean Group, but quite near the main island. As examined with a glass from the deck of the Peacock; Vatu-lele, for the greater part of its length, appeared to be only twenty to thirty feet high, and nowhere more than fifty feet. Besides vertical fissures, some of them wide enough to interrupt the land-surface, the face of the cliff seemed everywhere inaccessible and extremely ragged; presenting open-mouthed caves lined with stalactites, and long groove-like horizontal excavations, as though scooped out by the surf prior to the change in level.

LEEWARD PORTION OF THE GROUP. The Peacock having reached the Western side of Viti-levu, we were surprised at the total change in the aspect of the country; above the coast-line of mangroves, everywhere barren and brown, with forest-growth only in deep ravines, and on declivities around mountain summits; a result of the above-described difference in climate.

The immense tract of coral-reef that fills the ocean on the Leeward side of the group next came in sight; with Melolo and the other rocky ASAUA ISLETS projecting in the midst. This tract of coral-reef is separated from the rocky shore of the two main Feejee islands by a narrow channel, continuous throughout for some hundreds of miles; and the Peacock having entered, we were confined to the quiet water close along the land during the remaining weeks of our stay. The navigation, however, requires daylight; and the Peacock anchored.

On the 27th, the ship proceeded, with a light wind, threading her way in the narrow passage behind the coral-tract; but in spite of every precaution, struck on a lump of coral, about 5 P. M.; and getting clear shortly afterwards, was anchored.—On the 28th, I landed with others for about twenty minutes on the exposed surface of the coral-tract; and occupied myself with marine productions.

The ship proceeded, and on the 30th, I landed with others on the Northwest or leeward side of Viti-levu; a few miles from the town of MBA, which was concealed by *mangroves*. Several interesting plants were met with; including a remarkable *Capparis?*, a woody vine

with unarmed branches, and axillary, prickly branchlets; but the neighborhood was considered unsafe, and we did not stray far inland.

On the 1st of June, I landed with others at TUBUAI; on a peninsular islet, connected with the main land by a shelf of coral. On our way to the summit, four or five hundred feet in elevation, we passed among bushes with some trees intermingled, and also over open ground; remaining more than four hours on shore.

On the 2d, I landed with others on MALAKI; an islet, seven or eight hundred feet in elevation, and nearly opposite to the town of Raki-Raki. The surface was chiefly unwooded and covered with grasses; but shrubs and small trees occurred along the banks of some dried-up water-courses. Not far from the beach, stood another large tree of the submaritime species of *Ficus*, first seen by myself on Tongatabu.

Throughout the Leeward portion of the group, the country continued chiefly unwooded, but by no means so barren as was supposed in the distance; being distinctly green, covered with grasses, and much reminding me of the aspect of the Cape Verd Islands. The grasses, very generally in tufts more or less scattered, consisted chiefly of *Andropogon*, *Cymbopogon*, *Paspalum*, *Heteropogon*, and *Digitaria;* associated in somewhat moister situations, with frequent tufts of *Scleria*. Certain trailing plants were sometimes intermingled, as a *Plumbago*, a *gen. Rivinoid*, and in one instance an *Evolvulus;* also small ferns, as two species of *Cheilanthes* rather frequent; while of suffruticose plants, the *Waltheria* seemed entirely at home; the *Vitex*, too, extended far inland, but in the open country assuming a dwarfed form, simple-leaved, and hardly recognizable. Lastly, some real shrubs extended into and grew chiefly in the open country, scattered and more or less isolated: as the *Premna*, rather frequent; a *Phyllanthus*, three to five feet high; a white-flowered *Sesbania;* a *gen. Elatostemoid;* a *Grewia*, extremely frequent; a yellow-flowered *gen. Tiliac.*, also frequent; a *Hiptage?;* and various undetermined kinds of shrubs. Throughout the whole of the unwooded country, stocks of the *Pandanus* were conspicuous in the distance, growing singly at short intervals; but whether planted or truly indigenous, I was never able to determine. Far inland on the mountain-slopes, much of the surface was observed to be of a pale-green color; due to extensive tracts of dwarf, slender-stemmed *sugar-cane*, readily mistaken for beds of reeds.

The slight line of forest along the sea-coast, was in many places

reduced to the *mangroves* growing within the tidal overflow; but in ravines, the woods extended inland, far less luxuriant than on the Windward coast, but containing kinds of trees not previously met with: as a second species of *gen. Inga-like;* a thick-stemmed, *Urticeous* tree; an opposite-leaved *gen. Croton-like*, hardly more than an arborescent shrub; a *Sapindus?*; and other trees more rare and local, to be mentioned presently: *vines* also, tangling together the trunks and branches, were not altogether wanting. Steep, broken declivities on the distant mountains were observed to be covered with forest-growth; together with the mountain-tops, enveloped often in clouds, and receiving more than the usual proportion of moisture.

On the 3d, I landed with others, on a comparatively low ISLET, projecting into the channel between the two main islands, and marking the crossing-place. With some of our party, I walked along the beach nearly two miles, to some *cocoa-palms;* and at two different points, penetrated a short distance inland; among deserted plantations overgrown with *Cenchrus*, or bur-grass, and presenting scarcely any indigenous plants: indeed, among twenty-eight species of plants met with on this excursion, the list does not contain a single one worthy of special notice.

On the 5th, the Peacock crossed over to Vanua-levu, the Second main island; and entered MBUA BAY, often called Sandal-wood Bay. In the course of various excursions on shore, I found the country back of Vaturua, the Middle village, for some miles chiefly devoid of trees, gently-undulating, grassy, and somewhat monotonous. A remarkable *gen. Casuarinoid* occurred only here, its naked trunk and branches terminating in an umbrella crown, that in various directions overtopped the surrounding trees; and with a frequent, willow-like *Acacia*, a *Metrosideros*, beds of *Gleichenia* and *Pteris*, an *Epacrideous* shrub, and the normal *Casuarina equisetifolia*, contributed more of an Australian aspect than we observed elsewhere in the group. A small, *Symplocos-like* tree was however frequent in the open ground; alternating with scattered shrubs, more or less arborescent; as a *Maba*, an ornamental, red-flowered *Weinmannia*, a *gen. Ceanothoid*, a *Commersonia*, some *Myrtaceæ*, and other shrubs, in general becoming more frequent around the patches of woods; while in the midst of the woods, the *Flagellaria* was unusually abundant, its large panicles of white flowers conspicuously hanging in the tree-tops.—Much marshy ground occurs in the same vicinity; presenting in general the same

grasses and other plants as the adjoining upland, but containing a few peculiar species: as a yellow-flowered *Hibiscus* resembling H. scaber; two species of *Thelypteris;* a *Hedyotis* having the aspect of Veronica scutellata; a *Polygonum* resembling P. persicaria; a *Convolvulus* having small, white flowers; and a large species of *Scleria*, four to five feet high.

The peninsula shutting in the Bay on the Northwest, with the slight additional territory, taking in Haipaka Peak and the neighboring island of Anganga, constitutes the SANDAL-WOOD DISTRICT of the Feejee Islands. The land-surface is a little more broken than usual; with steep rocky hills of moderate elevation, in general barren, but from extending into the channel between the two main islands, partaking slightly of the advantages of Windward exposure; indeed, at the extreme point, there is a patch of woods, regarded in this part of the group as an object sufficiently remarkable to be tabooed.—On my second visit to the Bay, some weeks later, I landed in the Sandal-wood District, in company with Mr. Brackenridge and others. The plant itself, *Santalum*, had become rare; but some stocks were pointed out, not readily distinguished among the surrounding shrubs, the flowers being inconspicuous, and the newly-cut wood destitute of odor: we could discover no peculiarity of soil or situation that should restrict the species to such narrow limits. We passed a night at the chief's town, on the top of a high rocky knoll; in the environs of which, we found a greater variety of trees and interesting plants than in any other low portion of the Leeward side of the group; in conformity with the more broken character of the surface. Among the trees, was one kind that our native guides refused to climb, making signs, that it would produce an eruption on the breast and soles of the feet; a statement that seemed probable when specimens were procured, showing a *gen. Semecarpoid*, of the same natural family with our Rhus venenata.

Mr. Brackenridge and myself also made an excursion to the range of MOUNTAIN-CRESTS BACK OF MBUA BAY; about seven miles inland, and hardly less than two thousand feet in elevation. They proved easily accessible, and were covered with shrubs and trees; the exposure, from the superior elevation, being decidedly Windward; the sun was out, but the weather rainy and disagreeably cool, and the wind blowing heavily. The variety of plants proved less than we anticipated; but the trees and shrubs included a *Weinmannia*, re-

markable for its very long pinnate leaves; and a sort of *shrub-fern*, the rhizoma upright, rigid and branching in different directions to the height of four feet or more, with small, entire, scattered fronds, so Vaccinium-like as to be overlooked, mistaken for a real shrub.

The First visit of the Peacock lasted only six days: leaving Mbua Bay on the 11th, the ship continued inside of the coral-tract along the Northwestern or leeward shore of Vanua-levu; and on the 12th, reached NALOA. There is here a tract of barren, gravelly upland; several square miles of comparatively even surface, almost deserving the name of plain. The scattered, scrubby growth of detached, small trees, and intermingled bushes, brought to mind our New Jersey barrens; the wind sighing through the pine-like boughs of the *Casuarina* trees, while beneath, were thinly-scattered grasses, with here and there a low branchy *Schizæa* that might be mistaken for Sarothra, also frequent beds of *Pteris*. But these were intermingled with *Gleichenia;* and the scrubby forest-growth, seldom so thick as seriously to impede travelling, consisted of: a frequent *Alstonia*, twenty to twenty-five feet high; the willow-like *Acacia;* a *Cerbera;* the *Commersonia; gen. Ceanothoid; Mussænda frondosa*, seeming at home; a scarlet-flowered *Metrosideros;* a *Tubernæmontana;* the *Dodonæa*, frequent; a *Geniostoma;* and the shrubby *Phyllanthus*. A decumbent, woody vine was also growing around, an *Ionidioid*, having the habit and aspect of our Celastrus scandens.

On the 17th, the Peacock sailed from Naloa, continuing in the passage inside of the coral-tract; and on the 19th, arrived at MUTHUATA. The environs of the town are chiefly unwooded and barren, with the soil covered in a scattered manner with tufts of grasses. In the course of our excursions in different directions, a few plants were met with that were not seen elsewhere: as a *gen. Cynanchoid*, a shrub with linear leaves; a second shrubby species of *Desmodium;* and a tree *Euphorbia*, at least in the size of its trunk and branches, though only six to fifteen feet high.

On the 24th, with Mr. Rich and others, I set out for the MOUNTAIN-CREST BEHIND MUTHUATA; "2350 feet" in extreme elevation. The ascent proved steep and intricate, from the frequent necessity of avoiding precipices; and could hardly have been accomplished without a native guide. At the elevation of about two thousand feet, we entered a forest of small trees, affording a variety of interesting plants: as *Syzygium*, a tree forty feet high; a pinnate-leaved *gen.*

Terebinth.?; a round-leaved *Maba*; a Myricoid *Myrsine*, with an *Arceuthobium* parasitic on its branches; various novel *epidendric Orchidaceæ*; a *gen. Rhamnac.?*, climbing by means of the young branches; a *Memecylon?*; a *Melastomoid* shrub, with jointed stem; two Compositæ, one of them a *Eupatorioid* shrub, and the other herbaceous and *Bellis-like*; an *Eustrephus*, much like the Australian species; and especially, a single young stock of *Dammara* pine. At the highest point from which the ship continued visible, we kindled a fire and exchanged signals; but there was rising ground behind us, of gentle inclination, covered with a continuation of the low forest, and we were as much as a fourth of a mile from the extreme apex.—On the 30th, in company with Messrs. Rich and Peale and two natives, I visited the Western prolongation of the same mountain-crest. Following a different route, we found this portion of the crest easily accessible, and not much inferior in height; and from a small tree, a fine view was obtained of the mountainous Interior of the island; one remarkably sharp-pointed mountain-peak and other more rounded summits seeming as much as four thousand feet in elevation: an estimate confirmed afterwards when we were leaving the Group, by the dwindling of Muthuata Heights in the distant view.

On the 1st of July, the Peacock sailed from Muthuata, returning behind the coral-tract; and on the 5th, re-entered Mbua Bay. The Vincennes came in a few hours later, having left Ovolau five days previously, and visited Somo-Somo on the way.—On the 6th, I rejoined the Vincennes; and my subsequent botanical excursions, two of which have been mentioned, were principally made in company with Mr. Brackenridge.

Seasons. A "cool season" is distinguished by residents, as already stated; and in the progress of vegetation, some changes became manifest during our prolonged visit. Back of the Middle village at Mbua Bay, on the 13th, after an absence of hardly five weeks, I found flowers conspicuously more abundant on trees and shrubs; the willow-like *Acacia*, which before exhibiting no signs of flowering, was now everywhere in full bloom; the scarlet-flowered *Metrosideros* had become much more showy; the *Symplocos-like* tree was now really ornamental from the profusion of its small flowers; and a variety of shrubs, before seen only in bud, had advanced to flowering. The natives, in the meantime, had been busy with agricultural operations; the *banana* plants had been stripped to the midrib of the leaves, and

the old stocks grubbed up; and much of the ground under tillage had been burned over.

The Vincennes sailed early in the morning of the 29th, and the wind favoring, arrived towards evening at Naloa. After six weeks' absence, I revisited the village on the main land; where, by an unexpected development, the *Erythrina* trees around dwellings had parted with their leaves, and put forth a showy dress of scarlet flowers; "the time for planting yams" had arrived, but whether such an indication is required by the natives, I did not ascertain.

About 1 P.M. on the 30th, the Vincennes sailed; and the wind highly favoring, arrived in about four hours at Muthuata. After an absence of four weeks, I found the upland now manifestly suffering from drought.

On the 9th of August, the Vincennes and other vessels of the squadron sailed, continuing onward; and on the 10th, arrived at MALI; the country as before all the way bare of forests, but the hills much less elevated than at Muthuata.—On the 11th, the vessels entered the Mali Passage leading through the coral reefs, and regained the broad ocean.

CHARACTER AND COMPOSITION OF THE VEGETABLE GROWTH. Leaving, as before, the number of species, and regarding the vegetable growth in mass, as it meets the eye; there seemed to be eight prevailing Tribes of plants, occurring in the following order of frequency:

1. *Filices*, or ferns. The most abundant Tribe, as on the more Eastern groups.

2. *Graminaceæ*, or grasses. Holding the second rank; on account of the great extent of the unwooded Leeward portion of the group.

3. *Urticaceæ*. The species, with one or two exceptions, woody; consisting of shrubs, and of a very considerable variety of forest-trees.

4. *Myrtaceæ*. Mostly large shrubs; but including some trees of medium size.

5. *Euphorbiaceæ*. Shrubs and trees, in very considerable variety.

6. *Coffeaceæ*. Mostly shrubs; but including some climbing species, and some low herbs.

7. *Apocynaceæ*. Consisting of shrubs and woody vines; and even including trees of large size.

8. *Pandanaceæ*. Especially if *Pandanus utilis* be indigenous.

Next after the above, the following seven Tribes of plants were

observed to be abundant: *Orchidaceæ*, *Leguminosæ*, *Sapindaceæ*, *Araliaceæ*, *Pittosporaceæ*, *Convolvulaceæ*, and *Tiliaceæ;* to which I was sometimes tempted to add, *Cunoniaceæ*.

On referring to the Eastern groups, the principal changes in proportional frequency seemed to be the following: *grasses* had become abundant, prominent even in the landscape throughout the Leeward half of the group; *Leguminosæ*, for the first time in the Polynesian flora, were abundant; *Apocynaceæ* had also become abundant; together with *Euphorbiaceæ:* on the other hand, *Cyrtandraceæ* had become rare, at least in the Leeward portion of the group.

As already intimated, we had advanced near enough geographically for East Indian Analogies and connections to be frequent and almost dominant. East Indian *Ferns* now made their first appearance; together with *Balanophora*, *Myrmecodia*, *Robiquetia*, *Caryophyllus* or wild clove, *Leea*, *Memecylon*, *Dillenia*, *Cinnamomum*, and *Antiaris* or Upas.

At the same time, New Zealand Analogies and connections were more numerous and intimate than on the Eastern groups: shown by the presence of *Pittosporeæ;* of digitate-leaved, woody *Araliaceæ; epidendric Melanthaceæ; Dammara* pine; *Metrosideros; Melicope?; pseudo-Zanthoxylum;* abundant *Weinmannias;* a *Lagenophora;* and a *Clematis*, having the New Zealand habit, as also a *scandent Rubus.*— There were also some decided Australian Analogies: in the presence of a *Casuarinoid* tree; two phyllodia-bearing *Acacias;* an *Eustrephus;* an *Epacrideous* shrub; and a *Doodia*.

There was little left to remind one of Tropical America: beyond the unexpected appearance of a *Passiflora*, and of two *Malpighiaceæ;* unless, indeed, in the frequency of *Melastomaceæ*, a tribe that seems to be principally American.

Negative characters. Although our collections were fuller than at either the Samoan or Taheitian Groups; the Polynesian character was maintained in the vegetable growth, in the continued rarity of *Malvaceæ*, *Scrophulariaceæ*, *Labiatæ*, and especially of *Compositæ*.

The following additional tribes of plants made their appearance: *Ranunculaceæ*, the genus *Dillenia*, the genus *Pittosporum*, *Violaceæ*, *Rosaceæ*, the genus *Caryophyllus*, *Passifloraceæ*, *Balanophoraceæ*, *Phytolaccaceæ*, *Lauraceæ*, *Chloranthaceæ*, *Coniferæ*, *Smilaceæ*, and *Characeæ:* the only tribes that have disappeared, being Menispermaceæ and Aristolochiaceæ. With these modifications, the missing tribes of

plants are generally the same as in the Taheitian and Samoan groups; as will appear from the following List of them:

Magnoliaceæ,
Menispermaceæ,
Berberidaceæ,
Nymphæaceæ,
Papaveraceæ,
Fumariaceæ,
Cruciferæ,
Droseraceæ,
Polygalaceæ,
Frankeniaceæ,
Caryophyllaceæ,
Linaceæ,
Bombaceæ,
Hypericaceæ,
Marcgraaviaceæ,
Hippocrateaceæ,
Erythroxylaceæ,
Geraniaceæ,
Balsaminaceæ,
Oxalidaceæ,
Zygophyllaceæ,
Chailletiaceæ,
Aquilariaceæ,
the tribe Vicieæ,
Onagraceæ,
Halorageæ,
Ceratophyllaceæ,
Philadelphaceæ,
Crassulaceæ,
Paronychiaceæ,
the tribe Saxifrageæ,
Umbelliferæ,
Caprifoliaceæ,
Valerianaceæ,
Vacciniaceæ,
Ericaceæ,
the tribe Rhododendreæ,
Primulaceæ,
Gentianeæ,
Bignoniaceæ,
Myoporaceæ,
Plantaginaceæ,
Nyctaginaceæ?,
Salsolaceæ,
Eleagnaceæ,
Amentaceæ,
(Cycadaceæ),
Hydrocharideæ,
Alismaceæ,
Iridaceæ,
Hæmodoraceæ,
Amaryllideæ,
Hypoxidaceæ,
Commelinaceæ,
Pontederiaceæ,
Liliaceæ,
Juncaceæ,
Restiaceæ,
Typhaceæ,
the tribe Agrostideæ,
Equisetaceæ.

The following plants were found growing on the Feejee Islands:

Clematis sp. nov., (No. 1). Habit of the New Zealand sp.; leaves trifoliolate, the leaflets entire. "Ovolau," Brackenridge; rare.*

Dillenia (No. 1); compare D. speciosa. A small tree, twenty feet high; the flowers white. Frequent on Ovolau, and elsewhere.

(Euryandroid, No. 1); gen. incert. Habit of Leguminosæ; the leaves alternate, simple, or sometimes trifoliolate; axillary cymes; the corolla not seen; calyx and follicle Con-

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* Cardamine? sarmentosa, (No. 1, bis Metia to Tongatabu). Growing around dwellings on Ovolau; introduced (aboriginally, perhaps by colonial Polynesians).

Brassica (rapa; bis Taheiti and Tongatabu, and No. 2 Europe); the turnip. Levuka on Ovolau; introduced by trading and colonial Whites.

Urena (No. 1, bis Metia to Tongatabu). Naturalized in cultivated ground; (introduced by aboriginal settlers).

——— (lobata, No. 2); a second species. Leaves dissected, or deeply 5-lobed. Growing in cultivated ground at Rewa.

Gossypium (No. 1, bis Metia to Tongatabu). A shrub, four to six feet high; the leaves small, black-dotted, pubescent, trilobed, the lobes acuminate; flowers small. Abundantly naturalized, (having been introduced by aboriginal settlers). A variety producing ochrey or "nankin-colored wool," seen by Mr. Peale.

volvulus-like, but the calyx sometimes containing two follicles; the follicle cap-like, attached to receptacle, splitting laterally along the upper suture, and disclosing a red, fleshy, elongate drupe. Along wooded banks of streams at Naloa.

Uvaria; compare (No. 1) Samoa. A tree. Ovolau.

——— ? (No. 2). "Twenty feet high;" fruit subsessile. "Ovolau," Brackenridge.

Nov. gen. Capparid., (No. 1); sepals four; petals four; stamens few, and very long. A green-barked woody vine; the normal fruit-bearing branches unarmed, but with axillary branchlets that have opposite spines; leaves petioled, ovate, acuminate, reticulate; flowers arising in the axils in a linear series. Found by Mr. Rich at Mba.

Nov. gen. Ionidioid, (No. 1). A woody vine; habit of Celastrus scandens; leaves alternate, broad-lanceolate, petioled. On the barren plain at Naloa, and elsewhere.

Hibiscus (No. 2); near H. scaber of Florida. Six feet high; leaves with about five lobes, dentate; flowers yellow; carpels five, pointed, covered with hairs. Mbua Bay, growing in open, marshy ground.

Thespesia populnea; bis (No. 1 Samoa to Tongatabu). Frequent along the sea-shore.

Paritium tiliaceum; bis (Brazil, and No. 1 Metia to Tongatabu). Frequent along the sea-shore.

Sida (No. 5). Four feet high; ten aristate carpels. North coast of Viti-levu, and elsewhere; frequent.

Commersonia; compare (No. 2) Samoa. A small tree, thirty feet high, with the trunk eighteen inches in diameter; leaves cordate, inequal at base, the under surface tomentose. In clearings near Rewa; and frequent at Naloa.

Waltheria (No. 1). On barren hills in the Leeward portion of the group; and found on the island of Oneata, by Dr. Silas Holmes.

Firmiana (bis No. 1 Samoa?). A tree; leaves smooth on both sides, cordate, sometimes trilobed; carpels as if always open, with a placenta on each margin; two or more seeds. "Ovolau," Rich.

———; perhaps young; leaves five-lobed; no flowers, nor fruit. Mbua Bay.

Heritiera; bis (No. 1) Tongatabu. Silver-leaved. Maritime.

Nov. gen. procumbens, (bis No. 1 Metia to Samoa); Triumfetta of authors.

——— ? (No. 2); leaves pubescent, with three obtuse lobes; yellow flowers; no fr. Ovolau.

Gen. Tiliac. (No. 1); compare the Samoan genus, but yellow flowers, and four carpels, which are more elongate. Leaves ovate, serrate, petioled; terminal corymbs; four stigmas. A frequent shrub on the Leeward portion of the group.

Grewia; compare (No. 1) Tongatabu.

Hibiscus rosa-sinensis, (No. 1, bis Taheiti to Samoa). Along the banks of mountain-streams on Ovolau, highly ornamental, and the flowers single; also this, or the following, growing around dwellings at Muthuata.

———; regarded by Mr. Brackenridge as a distinct species, and "near H. liliiflorus;" the flowers small. Muthuata.

(Abelmoschus moschatus, No. 1, bis Taheiti to Tongatabu). Growing in cultivated ground, and apparently introduced. Observed at Mba, Ovolau, and in other localities.

——— esculentus? (No. 2). Cultivated by the natives; who, according to Mr. Brackenridge, principally make use of the leaves. (Introduced by aboriginal settlers).

——— (No. 2); apparently a second species. The leaves larger, more elongate, more regularly and finely crenate. "Ovolau," Brackenridge.

——— (No. 3); a third species. The smallest leaves; hairs on the fruit. An abundant shrub on the Leeward portion of the group.

Nov. gen. Tiliac., (No. 1). A tree, forty feet high; leaves subcordate; fruit seemingly composed of two flat, obovate valves, opening at the broad apex; but in reality two-celled, and many-seeded. Ovolau, and elsewhere.

(Gen. Symplocac.? No. 1); Prockioid. A tree, forty feet high; leaves large, alternate, oblong, petioled; short axillary racemes; flowers polyandrous; five small petals. On mountain-summits on Ovolau, at the elevation of two thousand feet.

——— ? (No. 2); Hopea-like. A small tree, ten to twenty feet high, ornamental; leaves alternate, entire; flowers polyandrous; calyx apparently 5-fid; petals five; drupe of the size of a pea, apparently inferior, Memecylum-like. Frequent around Mbua Bay.

——— ?; perhaps distinct from the last, the leaves not turning yellowish in drying. On the mountains back of Mbua Bay.

——— ?; gen. incert., compare Symploc. "Thirty feet high;" leaves alternate, coriaceous, entire, broad-lanceolate, petioled; calyx small, 5-fid; drupe obovate, apparently one-seeded. "Ovolau, at the elevation of 1500 feet," Brackenridge.

(Draytonia of Gray, No. 1; recorded as) Cleyera? An ornamental shrub, ten to twenty feet high; leaves alternate, petioled, serrulate; petals red. On the banks of mountain-streams on Ovolau.

Eurya?; compare (No. 1) Samoa. Mountain-summits on Ovolau, at the elevation of two thousand feet.

(Gen. Sapot.?, No 4). Ardisioid, and a congener of Tongatabu sp.; leaves scattered, smooth, petioled; five sepals; fruit solitary, peduncled, of the size of a large acorn, the style persistent. Growing at Mba.

Ximenia elliptica, Forst.; compare (No. 1) Samoa. A small, spreading tree; leaves alternate, entire, petioled; flowers in small umbels, monoecious?; calyx 4-fid; petals; style single; fruit superior, acid to the taste, orange-colored, as large as a green-gage plum, and containing one large nut. Littoral; rather frequent along the sea-shore.

Micromelum minutum; bis (No. 1) Samoa to Tongatabu. An abundant shrub.

———; perhaps only a dwarf variety; but not seen in Samoa, nor in Tongatabu, and only one to two feet high. Abundant, but without flowers.

Calophyllum inophyllum; bis (No. 1 Metia to Tongatabu). Littoral; growing only along the sea-shore.

Sida; compare (No. 4) Samoa. Small, decumbent. North coast of Vitu-levu, and at Naloa, and elsewhere; frequent.

Citrus sp. nov., (No. 1, bis Samoa). In some instances, evidently planted; occurring, also, in wild situations, but nowhere unequivocally indigenous; observed more than thirty feet high, in a plantation in the Sandal-wood District.

——— decumana, (No. 2, bis Tongatabu). A tree, often exceeding thirty feet in height. Abundantly planted by the natives, (having been introduced by aboriginal settlers).

——— aurantium, (bis Taheiti to Samoa). The fruit only once met with. Capt. Vanderford claimed to have first introduced the orange into the Feejee Islands.

——— (acida, bis Taheiti to Samoa); the lemon. The thick-skinned, warty variety every-

——— (No. 3); a second species. A spreading tree, forty feet high; the leaves narrower, and smaller. In fruit, near the village of Levuka on Ovolau.

———? (No. 4; compare No. 2 Samoa to Tongatabu); a third species. Twenty feet high; the leaves longer. On mountain-summits on Ovolau, at the elevation of two thousand feet.

Gen. Clusia-like, (No. 2). A tree of medium size; leaves Syzygium-like, opposite, the petioles cushioned at base; sepals four, and apparently four petals. Muthuata.

——— (No. 3; compare Discostigma Vitiense of Gray). "A tree, thirty-five feet high;" habit of Myrtus; leaves opposite, entire; pedicels axillary, bibracteate; berry superior, oblong, crowned with the expanded stigma, Nuphar-like but diminutive. "Ovolau, at the elevation of fifteen hundred feet," Brackenridge.

Hiptage? (No. 1); leaves elliptical, an inch long, petioled; fruit 4-alate. "North coast of Vitu-levu," Rich.—Apparently the same species on Ovolau, climbing, the inflorescence axillary and terminal, and large, purple flowers.

Gen. Malpigh.? (No. 1). An "upright shrub, ten feet high;" axillary pedunc., with glom. or umbellate clusters; leaves smooth, ovate, acute; no flowers, nor fruit. "Nemena, or Direction Island," Brackenridge.

Kleinhovia; bis (No. 1) Samoa. Savu-savu?, Brackenridge; rare.

Dodonæa; compare (Brazil, Lower Peru, and No. 1 Metia to Samoa) Viscous. Abounding on the barren upland of the Leeward side of the group, in the vicinity of the sea-coast.

(——— No. 2). A woody vine, having the habit of Celastrus scandens; leaves penninerved; terminal racemes on lateral branchlets; capsule like that of Dodonæa. Muthuata, and elsewhere.

Sapindus? (No. 1). A spreading tree, thirty feet high; leaves pari-pinnate, mostly 4-jugis, the leaflets lanceolate, entire; calyx 5-fid, three of the segments larger; petals five; stamens eight. Ravines on the Leeward coast.

———? (No. 2); a second species. "A tree, seventy feet high;" the leaves larger and broader, mostly trijugis; the stamens not elongate. "Ovolau," Brackenridge.

Cupania? (No. 3). "A tree, twenty feet high;" leaves pari-pinnate, mostly tri-jugis; capsule three-celled, and three-valved. "Ovolau," Brackenridge.

———? (No. 4). "A tree, thirty-five feet high;" leaves pari-pinnate, 4–5-jugis, the leaflets entire; fruit trialate, wider, of three cells, each containing one large seed. "Ovolau," Brackenridge.

(Gen. Sapindoid, No. 3). Cupanioid?; slender, ten to twelve feet high; leaves impari-pinnate, 10-jugis; long-branched racemes; calyx 5-parted; capsule triquetrous, tomentose. Ovolau.

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where abundant, but of inferior quality. Said to have been introduced by trading and colonial Whites.

Cardiospermum helicacabum? (No. 1, bis Metia to Tongatabu). In cultivated ground, introduced (by aboriginal settlers). North coast of Vitu-levu, and elsewhere.

Euphoria; bis (No. 1) Tongatabu. A tree, seventy feet high; leaves pari-pinnate, the leaflets penninerved; seed single. Planted around dwellings on Ovolau: I was informed, that after my departure "the fruit ripened, when the pulp became sugary and agreeable."

Oxalis; compare Samoa (and Tongatabu); leaves pubescent. Growing near the village of Naloa, apparently introduced.

Gen. Sapind.? (No. 1). A "woody vine;" leaves pari-pinnate, 2–3-jugis, the leaflets smooth, entire; lateral, branch. panic.; fr. of the size of an egg, the peduncle enlarging. "Ovolau," Brackenridge.

Gen. incert. with three-toothed calyx, (No. 1). A tree, thirty feet high; leaves alternate, impari-pinnate, 3–4-jugis, the leaflets entire, and short-petioled; fruit like an olive. On the mountains on Ovolau.

Gen. incert. with Bursaria-like, but indehiscent fruit, (No. 1). "A tree, thirty feet high, with the trunk a foot in diameter;" leaves impari-pinnate; axillary panicles; calyx regular, very small, 5-fid; two short stigmas on a persistent style. "On the mountains on Ovolau," Brackenridge.

Gen. Meliac. (No. 1). A tree; leaves pinnate, mostly 7-jugis, the leaflets subsessile, oblong, with obtuse point; flowers cylindrical, white, in compound racemes. On the low coral-islet of Nukulau.

Gen. Meliac.? with minute, 5-fid calyx, (No. 1). Twelve feet high; leaves impari-pinnate, 2–3-jugis, the leaflets penninerved; fr. in subsessile clusters; calyx 5-fid, minute; fruit? obovate, hairy. Ovolau.

——— ? (No. 2); seeming distinct. "A tree, thirty feet high;" leaves 2–4-jugis; fr. in racemes?. "Ovolau," Brackenridge.

Leea (No. 1). Four to ten feet high; a shrub, or rather an upright, rigid vine. Frequent in the forest; on Ovolau, and elsewhere.

———; possibly a second species; the fr. more crowded. Muthuata, at the elevation of a thousand feet.

Cissus (No. 2); leaves inequally cordate, crenate. Ovolau.

——— (No. 3); trifoliolate. "Ovolau," Brackenridge.

(Brackenridgea of Gray?, No. 1); Ochnac. Sometimes fifteen to twenty feet high; leaves smooth, broad-lanceolate, entire; sessile umbels; pedicels. In the Sandal-wood District.

Gen. Simarub.?; compare (No. 1) Samoa; and a congener of the New Zealand Zanthoxylum. Stem weak, ten to fifteen feet high; leaves opposite, entire, acum., petioled. Growing in the forest.

Gen. Zanthoxyl.? (No. 1). A shrub, eight to ten feet high, having the habit of Spiræa; leaves petioled, simple, ovate, entire, verticillate in threes; flowers minute, in panicles; two to four small, Weinmannia-like capsules. Mountain-summits on Ovolau, at the elevation of two thousand feet.

Melicope? (No. 1); compare mountain sp. on Tutuila in Samoa. A tree, fifteen to thirty feet high; leaves opposite, ternate, entire; flowers inconspicuous, axillary panic.?; four sepals, and a corolla; capsule apparently of two or four cells. On the islet at Muthuata.

Xylocarpus; bis (No. 1) Tongatabu.

Euodia; compare (No. 1) Samoa. Leaves long-petioled, trifoliolate, or sometimes simple. Often met with in cultivated ground, at Rewa and elsewhere; said to be used by the natives "in scenting cocoa-nut oil," and if so, showing peculiarity in their preferences.

Canarium? (No. 1). A tree; leaves impari-pinnate, mostly 10-jugis, the leaflets entire, inequal at base; drupe of the size of a walnut, sour, but edible, containing a depressed nut. Planted around Rewa.—This, or another species, seeming indigenous in a grove near Rewa.

———; bis (No. 2) Tongatabu. Long, branch. racemes; the fruit not seen. Growing at Mba, and elsewhere; rather rare.

Gen. Rutac.? (No. 1). A tree, thirty to forty feet high; habit of Hirtella; leaves sub-opposite, petioled, reticulate, bristly; red nervures; no flowers nor fruit. Ovolau.

(Gen. Acronychioid?, No. 3); leaves sub-opposite, oblong, entire and Erythroxylum-like, sub-articulate on the petiole; flowers dioecious?; calyx 4-parted; four petals?, calycine, and apparently four small intermediate ones; capsule tomentose, roundish, beaked. Naloa, and elsewhere.

(———? No. 4). A "woody vine;" small; leaves alternate, petioled, entire, pellucidly-punctate. "Ovolau," Brackenridge.

Acronychia? (No. 1); but the flowers monoecious; compare Egialitis. A thick-stemmed, upright shrub; leaves scattered, somewhat crowded towards the end of the branches, broad-lanceolate, entire, long-petioled, and articulate on the petiole; calyx 4-fid; petals 4?, minute; a nut. Ovolau.

Gen. Casearioid? (No. 1); compare S. American genus. Habit of Prinos; leaves alternate, entire, oblong, subsessile, deciduous (?); flowers axill. clust., inconspicuous, subsessile; calyx 5-parted, and petals; stamens about ten; fruit superior, elongate. "Ovolau," Rich.

Gen. incert., habit of Erythroxylum, (No. 1). A shrub, eight to twelve feet high; leaves alternate, entire; flowers pedicelled in axill. glomerul.; sepals five; five coriaceous petals?. "Ovolau," Brackenridge.—Compare Erythroxyloid growing on Ovolau, with 4-fid calyx, and about seven horn-like carpels.

Pittosporum (No. 1). A small tree, fifteen to twenty feet high; the leaves elliptical, petioled; the fruit roundish, 2-valved. Muthuata.

———? (No. 2). Six to twelve feet high; leaves lanceolate, acute, entire, tapering into a long petiole; inflorescence terminal; fruit two-valved, and like a walnut-kernel. Ovolau.

———? (No. 3); seeming distinct; the fruit walnut-like, and pubescent; leaves smooth, acuminate; petals coherent, and thus forming a tube. On the North coast of Viti-levu.

———? (No. 4); possibly a third walnut-kernel species, as the fruit is more elongate, and closely tomentose; a long and persistent style; leaves long-petioled. On the mountain behind Muthuata.

Gen. Pittosporac.? (No. 2). Leaves scattered, petioled, obovate, entire; axillary few-flowered cymes at end branch; calyx 5-fid, petals five; stamens about ten; berry of the size of a pea. Naloa.

Gen. Pittospor., Cordia-like; bis (No. 1) Tongatabu. A small tree; leaves obovate, entire, petioled; calyx 5 or 6-fid; petals? five; stamens ten?; fruit superior. Muthuata. and elsewhere.

Spondias dulcis, (bis No. 1 Metia to Tongatabu). Spoken of by trading and colonial Whites, as introduced into one district on Vanua-levu; but not seen by ourselves.

Tephrosia piscatoria, (No. 1, bis Metia to Tongatabu). Naturalized, but not abundant. Ovolau and Mba.

Crotalaria quinquefolia? (No. 1). A coarse, lupine-like herb, three to four feet high; leaflets 5-nate; the flowers yellow. Mbua Bay; introduced (by aboriginal settlers).

Desmodium; compare purple-flowered of Tongatabu. Rewa.

Celastrus? (No. 1); leaves oblong, crenate, shining on the upper surface, reticulate beneath; terminal racemes; capsule three-valved, three-celled, each cell containing one large orange-colored seed. Growing at Mba.

(Alphitonia, bis No. 2 Tongatabu); gen. Ceanothoid. A tree, twenty to thirty feet high, with the trunk a foot in diameter. (Malaki, on the North coast of Viti-levu.)

——— (No. 3); a third species. Smaller leaves, and usually only a shrub. Frequent on the Leeward side of the group.

Colubrina Asiatica; bis (No. 1 Metia to Tongatabu), but the leaves seeming smaller. Frequent.

Gen. incert. (No. 1), Rhamnac.?, as stamens alternate with calyx-segments. Climbing by means of the young branches, which entwine like tendrils; leaves alternate, ovate, entire; irregular racemes, the pedicels clustered; calyx 5-fid, the petals not seen. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

Gen. Rhamnoid (No. 1); agreeing at least in habit. A tree, thirty-five to forty feet high; leaves alternate, ovate, broad and short, penninerved, serrate; few-flowered racemes; the fruit an obovoid drupe, containing a very hard nut. Ovolau.

(Gouania? No. 1); Blackwellioid, but monoecious, and the calyx 5-fid. Leaves alternate, ovate, penninerved, pubescent; fruit inferior, and pubescent. Growing at Mba.

Gen. Semecarpoid, (No. 1). A tree, thirty feet high; panicles terminal; fruit larger than peduncle. In the low submaritime grove, opposite Rewa.

——— (No. 2); a second species; the leaves seeming less reticulate. A tree, forty feet high. Growing on hill-sides in the Sandal-wood District; and the contact, according to the natives, producing a cutaneous eruption.

Gen. Terebinth.?; bis (No. 2) Tongatabu. Leaflets penninerved, the under surface having close, ferruginous pubescence. On the low coral-islet of Nukulau.

——— ? (No. 3); perhaps a third species; rusty pubescence. A shrub; leaves impari-pinnate, bijugis; axillary racemes. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

Rhus? (No. 3). Habit of R. venenata; the petioles and young stems red; flowers white; stamens five. Muthuata.

(Connarus?, No. 1; recorded as) Geoffræoid. Leaves large, impari-pinnate, mostly 4-jugis; flowers small, in panicles, arising from the old wood; calyx regular, five-parted; a corolla; pod obovoid, compressed, covered with ferruginous pubescence. Ovolau.—Apparently the same species at Rewa, a tree, the leaves impari-pinnate and mostly 3-jugis, the leaflets penninerved, the pod pear-shaped, three-fourths of an inch long, covered with brown wool, and containing a single seed.

Sophora, bis (No. 1 Taheiti to Tongatabu). Littoral; growing along the sea-shore, on the North side of Viti-levu.

Sesbania (No. 1). A shrub, or small tree, three to fifteen feet high; leaves impari-pinnate,

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———; compare (No. 3) Samoa. Herbaceous, decumbent, the under surface of the leaves pubescent; terminal capit., with plumose bracts. On the Leeward side of the group.

Lablab (No. 1). Suture of the pod tuberc.; flowers white. Growing around dwellings in the environs of Rewa.

Phaseolus amœnus; apparently, bis (No. 1 Taheiti). Ovolau, and elsewhere.

Erythrina; bis (No. 1 Taheiti to Tongatabu). Abundant, and apparently introduced.

4–5-jugis, the leaflets small, and Phyllanthus-like; flowers white, and rather small; pod not seen. In open ground, on the Leeward side of the group.

(Dendrolobium, bis No. 1 Samoa to Tongatabu). A shrub, eight to twelve feet high; mostly littoral, or growing along the sea-shore. Ovolau, and on the North coast of Vitilevu.

(——— sp. nov., No. 2); a second species. A shrub, eight to ten feet high, many-stemmed; the leaves smaller, and thinner. Muthuata, at the elevation of a thousand feet.

Desmodium (No. 5). Having small blue flowers. "Ovolau," Brackenridge.

Dolichos; bis (No. 1 Taheiti to) Tongatabu. Yellow-flowered. Growing in maritime sands.

Mucuna (No. 2); leaflets very broad; ferruginous pubescence; large green flowers. Growing in clearings near Rewa.

———; perhaps not distinct from the last; pod broader and shorter than in the Taheitian sp., but in like manner having oblique alæ; leaflets large, the under surface pubescent. "Ovolau," Brackenridge.

——— sp. nov., (No. 3). Leaflets smooth, pointed; pod 4-alate, smooth on the sides. Growing at Mba.

(Gen. Mucunoid, No. 1). A thin-leaved woody vine; (the "flowers scarlet," according to Mr. Brackenridge). Woods on Ovolau, and elsewhere.

Kennedyoid; bis (No. 1) Tongatabu. Leaves pubescent, Rhynchosia-like; calyx bilabiate; flowers reddish-purple, the carina elongate. Rewa, and elsewhere; frequent.

——— (No. 2); apparently a second species. The leaves smooth, thin, green on both sides; and the flowers smaller. Ovolau.

Canavalia; bis (No. 1 Samoa to Tongatabu). Frequent.

Glycine?; compare (No. 1) Tongatabu. A woody vine, frequent along the sea-shore; used by the natives to poison streams of water, for the sake of capturing the fish.

(Derris?, No. 1; recorded as) Glycine, a second species. A woody vine, with Sesbania, like or Cassia-like foliage; leaves impari-pinnate, trijugis, the leaflets alternate, obovate-small. Climbing among mangroves at Naloa; and in the low submaritime grove, opposite Rewa.

(Pongamia?; No. 1); Amerimnoid and Robinia-like. A spreading tree, sixty feet high; leaves large, impari-pinnate, mostly trijugis; flowers purple, the calyx obsoletely dentate; the pod flat. On the low coral-islet of Nukulau.

Guilandina; bis (No. 1) Samoa to Tongatabu. Maritime; growing on the low coral-islet of Nukulau, and also at Mba.

———; apparently, bis (No. 2) Samoa to Tongatabu. Rare.

Cassia sp. nov., (No. 1). A shrub, three to five feet high; with showy flowers. Frequent on Ovolau.

——— (No. 2); apparently a second species. Larger; the flowers large, and the pods flatter; compare Chamæcrista. "Island of Oneata," Dr. Holmes.

———? (No. 2). A spreading tree, forty feet high; trifoliolate, the leaflets broad-lanceolate, flowers not seen. Near the village at Naloa; and again, at the Middle village on Mbua Bay.

Abrus precatorius, (No. 1, bis Metia to Tongatabu). Frequent, and probably introduced. The idol, or carved block of wood a foot in length, in the Oracle building at Levuka, was coated with the scarlet seeds.

Nov. gen. Acacioid, Tamarind-like, (Serianthes, No. 1, bis Taheiti to Tongatabu); having petals, and polyandrous. A spreading tree; forty feet high; leaves bipinnate, the petioles pubescent; pod compressed, continuous or not jointed, wide, pubescent, carinate on each suture. River banks, and elsewhere.

Acacia; bis (No. 1 Samoa to Tongatabu), the sp. with broad phyllodia. On the low coral-islet of Nukulau, and elsewhere; maritime.

——— nov. sp., (No. 2). A tree, twenty to thirty feet high, willow-like; the phyllodia narrow; pod broader and shorter than in the preceding species. Frequent on the barren upland, both at Naloa and around Mbua Bay.

Panzeroid (No. 1); Inga-like. A spreading tree, fifty feet high; leaves bijugis, and sometimes trijugis; pod large, broad, and flat, coriaceous, Panzera-like. Ovolau and elsewhere, growing near the sea-shore.

——— (No. 2); a second species. A branching tree, forty feet high; the leaves smaller, pari-pinnate, bijugis; a crowded raceme of ornamental, white, regular flowers; stamens about twenty. Growing at Mba. Figured by Mr. Agate.

———? (No. 3); possibly a third species. Smaller; leaves binate and Hymenæa-like; the flowers unexpanded, and seeming small. Growing at Mba.

(Entada) scandens; bis (No. 1 Samoa to Tongatabu). Leaves compound, pari-pinnate, bijugis; calyx monophyllous, with five obsolete points; flowers inconspicuous, in long spikes. Along wooded river-banks at Naloa, and on Ovolau, and elsewhere; apparently indigenous.

Rubus (No. 1). Climbing the trunks and branches of trees; leaves mostly five-lobed, the under surface pubescent; sepals short, equal; as also the petals. Ovolau, Rewa, and elsewhere; frequent.

(Petrocarya, compare No. 1 Samoa. Recorded as) gen. incert.; the "margarata" of the Feejeeans, furnishing the black paint with which they color the face and hair. Leaves alternate, penninerved, entire; fruit indehiscent, two-celled. In the Sandal-wood District.

——— (No. 2); a second species. Habit of Anona; a spreading tree, resembling a Juglans, fifty feet high, with the trunk two and a half feet in diameter; leaves smaller than in the last sp., penninerved, the under surface white and reticulate; fruit more irregular; terminal racemes. Mbua Bay.

Inocarpus edulis; bis (No. 1 Taheiti to Tongatabu). Chiefly growing in cultivated ground, and not seen high up on the mountains.

Lumnitzera coccinea; bis (No. 1) Tongatabu. Intermingled with the mangroves; and sometimes twenty feet high, with the trunk nine inches in diameter.

Terminalia (compare No. 1 Samoa); smooth, the fruit not alate. On the North coast of Viti-levu.

———; bis (No. 2) Samoa to Tongatabu. Frequent along the sea-shore, on the North coast, and elsewhere.

Terminalia (catappa); bis (No. 4) Tongatabu. A spreading tree, forty feet high. Planted around dwellings, (having been introduced by aboriginal settlers); the nut edible.

Jambosa (Malaccensis, No. 1, compare Taheiti to Samoa). An ornamental, spreading tree, sixty feet high, the petals and stamens red. "Ovolau," Brackenridge.

Cucurbita pepo, (bis Taheiti, and No. 2 North America). The squash, introduced by trading and colonial Whites.

Bruguiera (bis No. 1 Samoa to Tongatabu). A small tree, thirty feet high, with the trunk twelve to eighteen inches in diameter. Intermingled among the mangroves; frequent; in times of scarcity, the fruit eaten by the natives.

Rhizophora (compare No. 1 Samoa to Tongatabu). Several varieties were pointed out by the Feejeeans, but all seemed referable to the mucronate variety of Tongatabu; though the mucro was not always present. Arborescent; ten to twenty feet high, with the trunk sometimes nine inches in diameter; the low shrubby variety of Samoa and Tongatabu being nowhere met with. (The capsule or seed has a long, heavy, pointed appendage, as though to subserve the purpose of a stake or pile; but I do not now remember to have seen it sticking upright in the soft mud.)

Memecylon? (No. 1). Eight to ten feet high; fruit, by abortion, solitary along the branches. On the mountain behind Muthuata, at the elevation of fifteen hundred feet.

——— (No. 2); fruit rounder, perhaps, than in the last. "Ovolau," Brackenridge.

———? (No. 3); but the leaves sinuato-crenate, and larger. "Ovolau, at the elevation of one thousand feet," Brackenridge.

Melastoma Malabathricum?; bis (No. 1 Taheiti to Samoa). Growing in exposed situations, and in clearings.

———; possibly distinct, the leaves green on both sides. Mountain-summits on Ovolau, at the elevation of two thousand feet.

(Astronia, No. 3); gen. Melastom.; and a congener of (No. 2) Samoa. Twenty feet high; fruit small, and the flowers probably inconspicuous. Bank of stream at Mbua Bay, and elsewhere.

——— (No. 4); a congener of (No. 1) Taheitian mountains, and apparently of the last species. "Twenty feet high;" leaves smooth, trinerved; larger green fruit than in sp. of Mbua Bay. "Ovolau, at the elevation of a thousand feet," Brackenridge.

——— (No. 5). Eight feet high; leaves long-petioled. Bank of stream in the Sandal-wood District.

(Medinilla, No. 1; recorded as) nov. gen. Melast. A woody vine, climbing a hundred feet and more, over the tallest trees; leaves 5–7-nerved, subcordate at base, one leaf in each pair usually by abortion wanting; flowers in long white racemes, arising from the old wood; white flower-bracts. Ovolau, growing in the forest.

——— (No. 2); a congener of the preceding. A weak-stemmed shrub, climbing, but only to the height of twenty to thirty feet; fol. alt. smaller; red bracts. Mountain-summits on Ovolau, at the elevation of two thousand feet.

Gen. Melastomac., (No. 1). "Ten feet high;" leaves trinerved, with transverse nervules; long, ferruginous pubescence; no flowers. "Ovolau, at the elevation of fifteen hundred feet," Brackenridge.

Carica papaya, (bis Metia to Tongatabu, and No. 1 Tropical America). Abundantly cultivated, and more luxuriant than in any other country as yet visited; but the fruit seemed to be principally eaten by boys.

Portulaca; bis (No. 3) Samoa; compare P. pilosa. Around dwellings; introduced (by aboriginal settlers).

Mollugoid (No. 1), or Pharnaceoid. Leaves verticillate; several seeds. Frequent in cultivated ground, on Ovolau and elsewhere; (introduced by aboriginal settlers).

Hydrocotyle (No. 1, bis Samoa to Tongatabu). Growing around dwellings; introduced (by aboriginal settlers).

Gen. Melastom.? (No. 1). A shrub, the stem jointed; leaves 3–5-nerved, tenderly herbaceous, cordate at base, and closely sessile. Mountain-summit behind Muthuata, at the elevation of two thousand feet.

Caryophyllus nov. sp., (No. 1). Probably a tree of medium size; the flower-buds precisely similar to the cloves of commerce, but destitute of flavor. Mountain-summits on Ovolau.

———? nov. sp., (No. 2). Twenty feet high; leaves broader than in the other species; the flowers large. Planted near a dwelling at Rewa; but probably indigenous in some portion of the Group.

———? nov. sp., (No. 3). A small tree, branching, ten to fifteen feet high, with the trunk six inches in diameter; leaves narrower than in the last; fruit sulcate, and larger than in the other species. Planted around dwellings; but probably indigenous in some portion of the Group.

———? nov. sp., (No. 4). A weak-stemmed, rambling shrub, ten to fifteen feet high; the branches quadrangular while young; leaves broad-lanceolate, sub-petioled; the ripe fruit red. Frequent in the forest on Ovolau.

Eugenia (No. 1). A shrub, six feet high; leaves oblong, two inches by one; flowers white; calyx 4-fid; fruit orange-colored, as large as a plum, and containing one or more large seeds. Littoral; growing on Nukulau, and in other localities.

———; perhaps the same species on the North side of Viti-levu, but the fruit seeming more pubescent.

———(No. 2); regarded by Mr. Brackenridge as "a distinct species, having smaller fruit. Ovolau."

Myrtus?; bis (No. 3) Tongatabu. A shrub; leaves ovate, acuminate; terminal leafy panicles of white flowers; calyx 5-fid; petals five. Frequent in open ground, at Mbua Bay and elsewhere.

———? (No. 4). "A shrub;" terminal lax corymbs; red pisiform berries. "Ovolau," Brackenridge.

Gen. Myrtac. (No. 1). A shrub, six feet high; leaves oblong, acute at each end; panicle large and spreading, having long branchlets. Deep woods in the Sandal-wood District.

Syzygium nov. sp., (No. 4). A spreading tree, forty feet high, with the trunk two feet in diameter; terminal corymbs; calyx 4-angled, white. Mountain-summit behind Muthuata, at the elevation of two thousand feet.

———? (No. 5). "A shrub, fifteen feet high;" leaves oblong, acute at each end, three inches by one and a half; a large, terminal, branching panicle; calyx turbinate, not angular, the margin entire; corolla a lid. "Ovolau, at the elevation of fifteen hundred feet," Brackenridge.

Gen. Syzygioid, (No. 3); leaves obovate; terminal corymbs; flowers unexpanded, very small, young, and indistinct; the calyx apparently 4-toothed. "Ovolau," Brackenridge.

(Nov. gen. fruticosum, No. 1); Panax of authors. A shrub, two to four feet high; leaves alternate, compound, the leaflets with interrupted spaces, where reduced to the midrib; no flowers. Planted around dwellings; (having been introduced by aboriginal settlers).

Morinda citrifolia, (bis No. 1 Paumotuan coral-islands to Tongatabu). Frequent.—A variety "having short fruit," distinguished by Mr. Brackenridge.

Geophila (reniformis, No. 1, bis Taheiti to Samoa). Ovolau and elsewhere, frequent.

——— (No. 4); a second species. Larger in all its parts; leaves narrow-obovate, elongate; calyx 4-fid; distinct petals. "Ovolau," Brackenridge.

——— (No. 5); yet larger in all its parts. A tree, "thirty feet high;" leaves nine inches by four, pellucidly-punctate. "Ovolau, at the elevation of fifteen hundred feet," Brackenridge.

Metrosideros (No. 3); compare (No. 2) Samoa. Mountain-summits on Ovolau, at the elevation of two thousand feet.

———; perhaps the same species; leaves smooth, the upper surface shining, the under surface dull. A small tree, fifteen to twenty feet high, frequent on the barren upland at Naloa and around Mbua Bay, growing not more than a hundred feet above the level of the sea.

Gen. Myrtac.? (compare No. 1 Tongatabu?). A "tree, forty feet high;" habit of Clusia; the leaves large, thick, elliptical, with minute reticulations having a black dot in the centre; no flowers nor fruit. "Nemena or Direction Island," Brackenridge.

Barringtonia speciosa, (bis No. 1 Metia to Samoa). Submaritime, and not very frequent. Young stocks often seen surrounded by stakes, for their preservation; the fruit, when dry, being used by the natives for seine-corks.

——— acutangula? (No. 3); a third species. A tree, forty feet high; the leaves alternate, sessile, serrulate, mucronate; racemes two to three feet long; petals white; stamens pink, or rose-colored; fruit acute-angled. Ovolau; and in the low, submaritime grove opposite Rewa.

Gen. near Myrtac.? (No. 1); compare Hypericac.?, as the flowers yellow, and stamens. "A slender tree, twenty feet high;" leaves sessile, penninerved, and pellucidly-punctate; long, slender, few-flowered panicles of large flowers; calyx 4-fid; petals and stamens yellow. Ovolau.

Cucumis?; bis (No. 2) Tongatabu; leaves with about five lobes; flowers yellow. On the low coral-islet of Nukulau; and on the North side of Viti-levu.

——— (No. 3); the fruit pubescent, and rounder than in the Taheitian sp. Growing at Mba; and around the town of Muthuata.

Gen. Cucurbitac.; bis, (compare Samoa); leaves with five acute lobes; fruit small, smooth, and oblong; flowers minute. Muthuata.

(Luffa, bis No. 1 Samoa); leaves five-lobed, angulato-dentate; flowers yellow; interior of the fruit fibrous. Muthuata.

Passiflora (No. 1); leaves trilobed. Ovolau, and elsewhere.

Portulaca nov. sp., (No. 5). Large and upright; the leaves cuneate; flowers half an inch in diameter. "Nemena or Direction Island," Brackenridge.

Nov. gen. Cunoniac., (No. 1). An ornamental tree, thirty to forty feet high, with the trunk two feet in diameter; leaves opposite, ternate, entire; flowers red, chiefly arising

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Hedyotis paniculata; bis (No. 1 Samoa to Tongatabu). Ovolau, the North coast of Viti-levu, and elsewhere.

Ageratum (conyzoides?, compare No. 1 Brazil and the Peruvian Mountain-region); leaves hairy. Abundant everywhere; growing as if at home in the marshes around Mbua Bay.

(Adenostemma viscosum, No. 1, compare Taheiti to Samoa). Ovolau, and elsewhere; rather rare.—Apparently the same species, with lax inflorescence, in the marshes around Mbua Bay.

from the old wood; fruit elongate. Frequent, from the elevation of five hundred feet to that of two thousand on the mountains. Figured by Mr. Agate.

Weinmannia nov. sp., (No. 3). Leaves simple, smooth, with black dots; terminal cymes of racemes of rose-colored flowers. "Ovolau, at the elevation of twelve hundred feet," Brackenridge.

——— nov. sp., (No. 4). Leaves pubescent, 13-jugis. Mountain-crest back of Mbua Bay, at the elevation of two thousand feet.

——— nov. sp., (No. 5). An ornamental shrub, with red flowers; leaves smooth, impari-pinnate, bijugis. Mbua Bay, growing in open ground, very little above the level of the sea.

——— nov. sp., (No. 6). A small tree; leaves hairy, impari-pinnate, bijugis. Ovolau, at the elevation of five hundred feet.

———; perhaps a fifth species.

Gen. Cussonioid, (compare No. 1 Samoa to Tongatabu); being at least congeneric. Ten to fifteen feet high; flowers in panicled racemes. In woods, frequent.

Scheflera (No. 1); a congener of the New Zealand sp. Twenty feet high; leaflets 7–8-nate, sinuato-denticulate; the young leaflets decoupés or divided, bristly; umbels in a branching raceme. Ovolau, at the elevation of a thousand feet.

Nov. gen. Araliac. (Plerandra of Gray, No. 1); polyandrous. Fifteen to twenty feet high; leaves very large, the leaflets 9-nate; fruit also large; compound umbels. Ovolau, at the elevation of fifteen hundred feet.

Gen. Aralioid? (No. 1). "Twenty to thirty feet high;" leaves quinate, the leaflets coriaceous and entire. "Ovolau," Brackenridge.

Gen. Araliac.? (No. 1); at least agreeing in habit. The stem woolly; leaves ternate, with the leaflets argute-serrate, and scattered hairs. Ovolau.

Arceuthobium (No. 2; compare No. 1 Taheiti). Parasitic on the Myricoid Myrsine, on the mountain-summit behind Muthuata, at the elevation of two thousand feet.

——— (No. 3); possibly a second species; "compressed while living;" stems with about three ribs on each side. "Parasitic on Inocarpus, on Ovolau," Brackenridge.

Loranthus; compare (No. 2 Samoa to Tongatabu). Growing at Rewa.

——— (No. 4); possibly distinct. A fine ornamental species; the flowers red, tipped with black. Parasitic "on Inocarpus at Savu-savu" Bay, on the South side of Vanua-levu, Brackenridge.

Myrmecodia nov. sp., (No. 1). Epidendric, having roots, but growing on the trunks and branches of trees; tube of the corolla long and slender; the hollow, bulb-like base of the stem, invariably occupied as a nest by numbers of a large species of ant. Ovolau, at the elevation of a thousand feet.

——— nov. sp., (No. 2). Tube of the corolla broader and shorter; the flowers more showy. Mountain-summit behind Muthuata, at the elevation of two thousand feet.

Eclipta (compare Brazil and Peru). In taro-beds on Ovolau, doubtless introduced; once only met with.

Conyza (No. 1), bis Taheiti. Habit of Erigeron Canadense; pink or rosaceous flowers. Frequent in the open ground.

(Myriogyne minuta, No. 1, bis Taheiti to Samoa; recorded as) Grangea.

Bidens; bis (Taheiti to) Tongatabu. Frequent.

Gen. Coffeac. ? with Myrmecodioid fruit, (No. 1). A shrub, ten feet high ; leaves opposite, ovate, acuminate, cordate at base, long-petioled ; flowers tubular, white, in terminal clusters ; the fruit quadrangular. On the prolongation of the Muthuata mountain-crest, at the elevation of two thousand feet.

Morinda (No. 4) ; a third species. Climbing, smooth. Islet at Muthuata.

——— (No. 5) ; a fourth species. A "woody vine ;" leaves smooth, broad-lanceolate, five inches by two, acuminate, the upper surface shining ; fruit an inch in diameter. "Ovolau, at the elevation of twelve hundred feet," Brackenridge.

——— (No. 6). A vine, the leaves softly pubescent. Frequent ; collected and used by the natives for various economical purposes.

Nauclea (compare No. 1 Taheiti to Samoa). A small tree, thirty feet high, with the trunk a foot in diameter. Observed growing at the base of the mountains back of Mbua Bay.

Gen. Cinchonoid, (No. 1). Ten to twenty feet high ; ornamental ; the flowers white. Ovolau, and on the islet at Muthuata.

Mussænda frondosa ; bis (No. 1 Samoa). Frequent ; often growing in wild situations, and perhaps really indigenous.

Nov. gen. Oxyanthoid, (No. 1). A shrub, ten feet high ; habit of Guettarda ; leaves opposite, broad-obovate, penninerved ; corolla 4-fid, dividing into four large lobes ; capsule cylindrical, six inches long, crowned with a perfectly circular calyx. Ovolau ; and also in the Sandal-wood District.

——— (No. 2) ; a second species. "Twelve feet high," the leaves oblong, and narrower ; flower tubular. "Ovolau, at the elevation of a thousand feet," Brackenridge.

Psychotria ? (No. 3). "A shrub ;" large, lanceolate leaves ; terminal corymbs ; berry large, with about eight sulci, and containing two large seeds. "Ovolau," Brackenridge.

Guettarda speciosa ; bis (No. 1 Paumotuan coral-islands to Tongatabu). Near the seashore, rare.

Gen. Coffeoid, (No. 5). In woods on Ovolau.

Gen. Coffea-like, (No. 3) ; a congener of Samoan sp. Leaves petioled ; red sessile fruit. In woods on Ovolau.

Chiococca ? (No. 2) ; near the Taheitian species. At Mba, met with once only.

Gen. Chiococcoid, (No. 1). A woody vine ; leaves tapering into a petiole, not shining ; terminal panicles ; calyx 5-fid ; berries white. Ovolau.

——— (No. 2) ; congeneric ? A woody vine, the leaves shining ; cymes axillary ; berry tuberc.? ; a gland or tubercle in the axils of the nervures. Ovolau.

Gen. Coffeac. with projecting calyx, (compare No. 1 Tongatabu). A shrub, five to eight feet high ; calyx tubular, projecting beyond the end of the red fruit. Islet at Muthuata.

(Wollastonia scabriuscula, No. 1, bis Samoa to Tongatabu). Abounding in clearings ; in some instances, almost forming thickets.

Villarsia (No. 1) ; a congener of North American species. Frequent in taro-ponds ; probably introduced.

(Batatas) ; bis (No. 1 Taheiti to Tongatabu) ; cordato-hastate leaves, and purple flowers. Frequent and growing spontaneously ; extending to the elevation of a thousand feet on the mountains behind Muthuata, and elsewhere.—The sweet potato, B. edulis (bis Metia

Coprosma? (No. 1). A low shrub; leaves petioled, small, oblong, half an inch or more in length; terminal cymes; berry two-seeded. Ovolau.

Gen. Coffeac. with Hydrangea-like capsule, (No. 1). A shrub; the young leaves with ferruginous or silky pubescence; a large, intermediate stipule; axillary cymes; the calyx-segments long, linear; capsule small, bipartile. Ovolau.

Ophiorhiza (No. 1); a congener of New Zealand sp.? Herbaceous, a foot high, branching at the summit; leaves sub-verticillate, spatulate; flowers terminal, solitary; fruit bilobed, or like two capsules united. In woods on Ovolau.

——— (No. 2); a second species. The leaves and flowers larger. "Ovolau," Brackenridge.

——— (No. 3); a third species.

Gen. Ophiorhizoid, (No. 1). Habit of the preceding genus; long, tubular, white flowers. Frequent in the forest on Ovolau.

Hedyotis nov. sp., (No. 2). Habit of Vahlia and Veronica scutellata; the leaves linear. Growing in marshes, near Rewa and elsewhere.

———? Lapeyrousii, (No. 3). Habit of Diodia and Spermacoce. Frequent.

Gen. Ixoroid, (No. 1); but the corolla 5-fid, the tube slender and white; leaves long-petioled. Ovolau, at the elevation of a thousand feet.

Gen. Coffeac.? with a long, deciduous, intermediate stipule, (No. 1). Fr. solitary, rare. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

Gen. Coffeac., the calyx apparently 4-fid, (No. 1). A shrub; leaves broad-lanceolate; a few-flowered, terminal panicle. On the mountain behind Muthuata.

Gen. (Mussændoid?, No. 4); Coffeac.? Leaves petioled, oblong, the nervures given off at right angles; large, terminal, branching panicles; calyx 5-fid; corolla with five segments. (Ovolau.)

Gen. Coffeac.? with Calophyllum-like leaves, (No. 1). A tree, fifty feet high; leaves opposite, entire, Calophyllum-like; the intermediate stipule large, and deciduous; berry pedicelled, pisiform or pea-like, green. Ovolau, growing along the sea-coast.

Gen. Coffeac.? dioecious?, (No. 1). A shrub, six to eight feet high; flowers minute, the corolla dividing into four linear segments; two distinct stigmas, as in Urticaceæ, but the fruit inferior. Muthuata, at the elevation of a thousand feet.

Gen. Coffeac.? Skinnera-like, (No. 1). Sub-herbaceous; leaves lanceolate, entire, petioled; no flowers. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

(Shawia?, No. 1); gen. Eupatorioid, compare the New Zealand genus. A shrub, ten to fifteen feet high; leaves alternate, ovate, sinuato-dentate; flowers blue. On the mountain-summit back of Muthuata, at the elevation of two thousand feet.

(Lagenophora, No. 1); a congener of New Zealand sp.? Bellis-like; leaves lanceolate,

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to Samoa), was not seen under cultivation by myself; but was spoken of as occurring on one of the outer islets of the Group.

Nicotiana tabacum, (bis Metia to Tongatabu, and No. 6 North America). Introduced by trading and colonial Whites; but now planted in small patches around the dwellings of the natives. Manufactured tobacco was everywhere in request; and pieces given to the natives, served sometimes as a substitute for money.

attenuate, dentate, hairy. On the mountain-summit behind Muthuata, at the elevation of two thousand feet; rare.

Conyza? (No. 2). A stout herbaceous plant, four to five feet high, and having the habit of Cynoglossum and Verbascum; leaves broad-lanceolate; flowers in a many-branched panicle. Mountain behind Muthuata, at the elevation of fifteen hundred feet.

Bidens nov. sp. (No. 1). Leaves mostly radical, pinnatifidly incised, multifid; flowers very small, bright yellow, the rays minute. Barren hills around Muthuata.—Compare the pseudo-Umbellif. of the North coast of Viti-levu, Torilis-like, herbaceous, decumbent, the leaves dissected, and the segments linear.

Scævola; bis (No. 1 Paumotuan coral-islands to Tongatabu). A shrub, six to ten feet high. Growing along the sea-shore, and on the low coral-islet of Nukulau.

——— nov. sp., (No. 2). Six feet high; leaves lanceolate, denticulate; terminal panicles; flowers small. In clearings near Rewa.—Perhaps the same species, the leaves oblanceolate, sinuato-dentate; growing on "Ovolau, at the elevation of a thousand feet," Brackenridge.

(Cyathodes, No. 2). An Epacrideous shrub, six to eight feet high; fruit on fleshy white clavate pedicels. Seen only at Mbua Bay, growing not more than two hundred feet above the level of the sea.

Gen. Myrsin. Myrica-like, (No. 3); compare Taheiti to Samoa. Bushy, fifteen to twenty feet high; leaves alternate, oblong, entire; calyx 4-fid; style single; berries solitary, containing one large seed. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

(Myrsine? No. 1; recorded as) gen. Myrsin. Woody; the leaves alternate, entire, opaque, dotted; fruit long-pedicelled, marked with lines. "Ovolau," Brackenridge.

(———? No. 2); apparently a second species; larger leaves; axillary panicles. "On mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

Mæsa; compare (No. 1 Samoa to Tongatabu). Leaves oblong-ovate, entire; calyx 5-fid; corolla monophyllous; capsule mostly inferior, one-celled, but the many seeds separated apparently by partitions. North coast of Viti-levu.

———? (No. 2); compare also Porana. A weak shrub; pubescent; leaves alternate, cordate, denticulate; terminal, many-flowered panicles; corolla monophyllous, 5-fid. Muthuata, at the elevation of a thousand feet.

——— (No. 3); apparently a third species. Leaves alternate, broad-lanceolate; racemes panicled; flowers very small. Mbua Bay.

Maba; apparently the same with Samoa sp., (compare also Tongatabu). On the North coast of Viti-levu.

——— nov. sp., (No. 3); a third species. Ten to fifteen feet high, bushy and leafy;

Physalis; bis (Taheiti to Tongatabu). Low, smooth. Growing in cultivated ground; having been introduced (by aboriginal settlers).

——— (edulis, bis Taheiti to Tongatabu, and compare No. 7 Chili and Peru); the Cape-gooseberry; the plant pubescent. Introduced; observed in various localities, and by Dr. Holmes on the "Island of Lakemba."

Solanum repandum, (No. 1, bis Taheiti to Samoa). Sometimes seen regularly cultivated; proving productive; the fruit hairy, but the flavor agreeable. (Introduced by aboriginal settlers).

the leaves sessile, obtuse, roundish or oblong-elliptical, cordate at base; fruit short toment. On the mountain-summit back of Muthuata, at the elevation of 2000 feet.

——— ? (No. 4). "A shrub, with few, slender branches;" hairy; leaves broad-lanceolate, subcordate at base, subsessile. "Deep woods on Ovolau," Brackenridge.

——— (No. 5); a fourth species, seeming distinct from the last. "A tree, fifteen feet high;" the leaves smooth, and more coriaceous. "Ovolau," Brackenridge.

——— (No. 5); a fifth species. A bush; under surface of the leaves pubescent; flowers very small. Growing in open ground, at Mbua Bay.

Jasminum Australe; bis (No. 4) Tongatabu. Simple-leaved.

———; bis (No. 5) Tongatabu. Young stems puberulous; leaves trifoliolate; flowers small, the tube of the corolla short; smaller fruit. At Mba.

Gen. Jasmin.? (No. 1). A shrub, six to ten feet high; leaves opposite, entire, acuminate; calyx terminating in four long segments, and splitting laterally to expose the berry; no mark of a style. On the mountain-summit (back of Muthuata), at the elevation of 2000 feet.

Gen. Oleac.? (No. 1). "A tree, forty feet high;" the leaves large, opposite, entire, obovate, petioled; drupe an inch long, like an olive but rough. "Ovolau," Brackenridge.

(Strychnos?, No. 1). A vine, Ripogonum-like; leaves opposite, trinerved, ovate, entire, smooth; fruit orange-colored, inferior?, of the size of a plum. In the Sandal-wood District.

Alyxia; compare (No. 5 Samoa to Tongatabu). Fruit short, broad, moniliform. On the North coast of Viti-levu; and also at Muthuata.

———; compare (No. 7) Tongatabu. A vine; large-fruited. In woods on Ovolau, frequent.

——— (No. 8); a congener of the last. A woody vine; leaves verticillate in threes; berries smaller, single, or sometimes in pairs. Naloa.

Melodinus?; bis (No. 1) Tongatabu. The stem white, climbing; drupes geminate, elongate, of the size of a plum. On the mountains back of Mbua Bay, at the elevation of fifteen hundred feet.

(Tylophora?, No. 2); gen. Cynanchum-like, or compare Hoya. Cordate leaves; green flowers; beaked fruit. On the North coast of Viti-levu.

Hoya; compare Samoa. Leaves broad. Neither abundant.

——— (No. 4). Smaller; the leaves more pointed; "flowers flesh-colored. Ovolau," Brackenridge.

Cynanchum? (No. 1); with small, purplish flowers. Growing at Mba.—Apparently the same species, with broad-ovate leaves, small greenish and brown flowers, and long follicles, found on "Ovolau" by Mr. Brackenridge.

——— (No. 8). Habit of the preceding, and of S. melongena; calyx small; flowers white, and rather small; fruit as large as an apple, white with a purplish tinge while unripe, afterwards becoming yellow and edible; usually cooked, but pleasant to the taste in the crude state. Naloa and Muthuata; cultivated by the natives. (Seeds were carried by the Expedition to the Hawaiian Islands, and to the United States; but the fruit was found to take a long time in ripening, and was produced very sparingly).

Gen. Apocyn. (No. 1). A vine; leaves broad-lanceolate; no flowers. "Ovolau," Brackenridge.

(Alstonia?, No. 4); Amsonioid; a fourth species. A small tree, twenty to twenty-five feet high; the leaves large and broad. On the barren upland at Mbua Bay and Naloa, frequent.

(———); perhaps distinct; the leaves smaller and narrower.

(———, No. 5); seeming distinct, a fifth species. A shrub; smaller leaves, and small flowers. On mountain-summits on Ovolau, at the elevation of 2000 feet.

Cerbera; compare (No. 1 Taheiti to) Samoa; but the leaves seeming more lanceolate. A small tree, ten to fifteen feet high; white bracts. Growing in open ground, often at a distance from the sea-coast.

———; bis (No. 3) Tongatabu; obtuse fruit. Littoral, growing along the sea-shore.

——— parviflora; bis (No. 4) Tongatabu. Growing along the sea-shore, occasionally or at intervals.

Gen. Cerberoid, (No. 1). A tree, twenty-five feet high; leaves a foot long, verticillate; long pedunc. below leaves, the flowers in elongate capit., each surrounded by bracts. Ovolau, at the elevation of sixteen hundred feet.

(Tabernæmontana, No. 2); seeming distinct from the Tongatabu sp. A shrub, three to five feet high. Frequent on the Leeward portion of the group.

Gen. Nerioid, (No. 1). An ornamental tree, fifty to sixty feet high; flowers tubular, large, white. On the mountains on Ovolau, at the elevation of a thousand feet; rare. No specimens.

Gen. Cynanchoid, (No. 1). A shrub, three to five feet high, something of the habit of Hovenia; leaves linear; flowers small, greenish-brown. On the barren upland around Muthuata.

Geniostoma; compare (No. 4) Tongatabu; having the same powerful coprosmoid odor. Mbua Bay, Naloa, and elsewhere; rather frequent.

——— (No. 5); perhaps a second species. Twenty feet high, with longer leaves; not fetid. Islet at Naloa; also at Muthuata, and elsewhere.

Labordia? (No. 4). Six feet high; leaves smaller than in Tongatabu sp. Rewa?, and also at Mbua Bay.

Gen. incert.; (Couthovia of Gray?, No. 1). A tree, forty feet high; leaves opposite, 4 inches by 2½, entire, sheathing at base; terminal corymbs; calyx minute, 5-fid; drupe elongate, contracted or stipitate at base, apiculate with the style. Ovolau.

(Fagræa?, No. 1); gen. Bignonia-like. An ornamental tree, twenty-five feet high; leaves opposite, entire, petioled; terminal spreading cymes of cream-colored, Bignonia-like flowers; corolla infundibuliform, 5-lobed; five stamens, two of them longer. In the Sandal-wood District.

Cyrtandra (No. 8). Ovolau.

——— nigrum? (bis Taheiti to Samoa, and compare No. 28 California, Chili, and Peru). At the village of Levuka on Ovolau; introduced.

Capsicum (frutescens; bis Taheiti to Tongatabu, and No. 4 Peru). The fruit seen at Levuka, on Ovolau. Introduced, probably by trading and colonial Whites.

Lindernia (No. 1, bis Taheiti to Samoa); the flowers blue. Frequent in pathways, and similar situations; apparently introduced.

——— (No. 9); a second species. A shrub; smooth. "Ovolau," Brackenridge.

——— (No. 10); large leaved; long ferruginous wool. Ovolau.

———? (No. 11); long, obovate leaves; flowers in terminal clusters; calyx very large, enveloped with large bracts; corolla slender, 6-fid. Ovolau.

Evolvulus (No. 1). Creeping; one to two feet long. On a rocky steep on the islet opposite Muthuata.

(Pharbitis ?); compare (No. 1) Tongatabu. Large blue flowers. Ovolau.

(Ipomoea) turpethum? (bis No. 1 Metia to Tongatabu). Leaves roundish-cordate, acuminate; tube of the corolla broad and short. On the low coral-islet of Nukulau, and elsewhere on the sea-shore.

———; perhaps distinct from the preceding; the inflated calyx becoming fleshy. Mbua Bay, frequent in the open ground, even at a distance from the coast.

——— pes-capræ (bis Brazil, and No. 2 Metia to Tongatabu). On maritime sands; observed also on high ridges exposed to the sea-atmosphere.

(——— No. 3), sp. nov. Leaves oblong, obtuse; flowers small, white. Growing in marshes, near Rewa, and elsewhere; frequent.

(——— pes-tigridis?, No. 4). Leaves deeply lobed, the lobes acute; flowers white. Growing at Mba.

(———, No. 5), sp. nov. Leaves cordate, acute; flowers in cymes, white. On the North coast of Viti-levu.

(Aniseia, No. 1). Leaves lanceolate; segments of the calyx decurrent on the peduncle; capsule 4-valved, 4-seeded. "Naloa," Rich.

Cordia; bis (No. 1) Taheiti? to Samoa. A tree, thirty to forty feet high; leaves large, broad-ovate. On the low coral-islet of Nukulau, and elsewhere on the sea-shore.

———; possibly a second species; smaller, the leaves inequally ovate. Ovolau.

Nov. gen. aspera; bis (No. 1) Samoa to Tongatabu; Cordia of Forster. The flowers inconspicuous. Ovolau, Rewa, and elsewhere.

Gen. incert. with 4-fid calyx, (No. 1). A tree; leaves ovate, alternate, entire, penninerved, pubesc. pet.; racemes below; calyx 4-fid; drupe of the size of a cherry, the rind hard, but containing a single, large, soft seed. Ovolau.

Gen. incert. Prunus-like, (No. 1). A stout shrub, having the habit of Prunus; leaves ovate, entire; racemes of one-sided drupes, each containing a single seed or nut; apparently four stigmas. Ovolau.

——— (No. 2); a second species. A shrub; leaves ovate, alternate, entire; fruit in racemes, a drupe almost beaked from the persistent stigma, and apparently two-valved. Ovolau.

Cordioid (No. 1), at least in habit; the leaves Tiliaceous and cordate, but opposite; terminal cymes of very small flowers. "Ovolau," Brackenridge.

Tournefortia (argentea, bis No. 1 Paumotuan coral-islands to Tongatabu). On the coral-

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(Curanga); bis (No. 1) Samoa. Gratiola-like; but purple-flowered. Ovolau, growing in wet taro-beds.

Ocymum (sanctum?, No. 1, bis Taheiti to Samoa). David Whippy, a resident American, claimed to have introduced this plant "from Taheiti." We found it very generally cultivated by the natives; who intimated, that the odor was disagreeable to them. Also, observed by Dr. Holmes on the "Island of Munia."

islet of Nukulau, and elsewhere on the sea-shore; and found by Dr. Holmes on the "Island of Fulari."

Solanum; compare (No. 4) Tongatabu; but smooth. Growing on a hill on the North coast of Viti-levu; and found by Dr. Holmes on the "Island of Lakemba."

——— (No. 5); near the preceding. Suffruticose, spreading, one to two feet high; leaves lanceolate, roughly toment.; flowers and fruit rather small. Barren hills around Muthuata.

——— (No. 6); also near the first; compare S. verbascifolium. Muthuata.

——— (No. 7). Base of the stem suffruticose; smooth, lanceolate leaves; small flowers. "Rocks on Ovolau," Brackenridge.

Gen. Cestroid, (No. 2). A shrub, "ten feet high;" leaves ovate, alternate, entire; no flowers; berries red. "Ovolau," Brackenridge.

Gratiola (No. 1); flowers very small, white. Growing around a spring on the North coast of Viti-levu, and in similar situations elsewhere.

——— (No. 2); possibly a second species. Stems upright, weak, one to two feet high; leaves ovate, serrate, sessile. Growing among grass in a marsh at Naloa.

Ocymum; compare (No. 2) Manua, in the Samoan Group. Ovolau.

(Premna; bis?, compare No. 1 Metia to Tongatabu). Leaves green on both sides, smooth, entire, broad, inequal, sometimes cordate at base, pubesc. petiol. On the low coral-islet of Nukulau, and elsewhere.

———; apparently distinct, the leaves pubescent. Frequent along the sea-shore, and occurring also some distance inland.

Clerodendrum inerme; bis (No. 1 Samoa to Tongatabu). Growing near the sea-coast, but less abundantly than at Samoa and Tongatabu.

———; possibly a second species?. Unarmed; the leaves larger and broader. On the mountains on Ovolau.

Vitex; bis (No. 1 Samoa to Tongatabu). Sometimes twenty feet high. Frequent along the sea-shore; the simple-leaved variety extending inland, on the hills of the Leeward portion of the Group.

Justicia (purpurea?, compare No. 1 Samoa). An ornamental shrub, six feet high, with purple flowers. Frequent; and sometimes cultivated.

——— nov. sp., (No. 2). A shrub, having the same habit, and six feet high; flowers pale blue. Base of the mountains back of Mbua Bay; rare.

Dicliptera? (No. 1); flowers small. Ovolau.

Plumbago (No. 2; compare No. 1 Taheiti). Suffruticose, trailing; flowers white, the petals acute. Growing at Mba.

Desmochæta; compare (No. 1 Taheiti to) Samoa. "Savu-savu," Brackenridge.

———? (No. 2); compare the preceding sp.; florets purplish. "Rewa," Rich.

Polygonum nov. sp., (No. 2). Habit of P. persicaria; short spikes; glandular hairs on pedunc. Growing in marshes, at Rewa and elsewhere.

Cassyta; bis, compare (No. 1 Paumotuan coral-islands to Tongatabu). Growing at Rewa, and along the sea-shore.

Leucas 10-dentatus, (bis Metia to Tongatabu). Frequent; having been introduced (by aboriginal settlers).

Teucrioid; bis (No. 1) Tongatabu. Calyx swelling; the calyx-teeth equal; apparently no upper lip to the corolla. Growing in cultivated ground.

Laurus (No. 1). "A tree, twenty feet high;" leaves alternate, entire, green on both sides; a cup at the base of the fruit. "Ovolau, at the elevation of a thousand feet," Brackenridge.

——— (No. 2); seeming distinct; the flowers inconspicuous. Growing near the Middle village at Mbua Bay.

Gen. Laurac. (No. 1); a congener of New Zealand sp. "A tree, thirty feet high;" leaves large, eight inches by five, broad-ovate, entire, the under surface glaucous, the margin revolute; short, few-flowered racemes. "Ovolau," Brackenridge.

——— ? (No. 2); a congener of New Zealand sp. ?. Eighteen to twenty-five feet high; leaves small, ovate, entire, the under surface glaucous; involucre 2-phyll.; flowers pedicelled. Ovolau.

Cinnamomum (No. 1). Fifteen to twenty feet high; leaves trinerved. Growing on mountains on Ovolau and back of Mbua Bay, from the elevation of fifteen hundred to that of two thousand feet. Flavor of the bark like that of cassia, but stronger.

——— (No. 2); possibly a second species. The leaves small, and not trinerved. On the mountain-summits back of Mbua Bay, at the elevation of two thousand feet.

———; compare the last sp. A branching shrub, ten to fifteen feet high; leaves opposite, not aromatic; drupe elongate, one-seeded. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Myristica; bis, (apparently No. 3) Tongatabu. Leaves broad, glaucous beneath. Frequent on the mountains on Ovolau.

——— (No. 4); possibly distinct. A smaller tree; the leaves very large, sometimes two and a half feet long. On mountains on Ovolau.

Daphne; compare (No. 1 Taheiti to Tongatabu). Ovolau, and elsewhere; frequent.

Dais; bis (No. 1 Samoa to Tongatabu). Frequent along the sea-shore.

——— (No. 2). A "tree, thirty feet high;" the leaves smaller; "flowers mostly on the trunk. Ovolau," Brackenridge.

(Gen. Dais-like, No. 3). A fine ornamental plant; leaves oblong; terminal clusters of five to six tubular flowers; two cordate, involucr. bracts. Woods on Ovolau.

(———, No. 4); distinct?. Ornamental, and "fragrant;" leaves lanceolate, short-petioled, green on both sides; inflorescence terminal; corolla 4-fid, white, the tube an inch and a half long; fruit half an inch in length, somewhat compressed. "On the mountains behind Muthuata," Rich.

Gen. Rivinoid, (No. 1). Trailing; leaves narrow-ovate, entire; spikes axillary and terminal; four petals, or rather sepals; berries red; three styles. Growing at Mba; and observed by Dr. Holmes on the "Island of Oneata."

Santalum (No. 2); leaves broad and elliptical; fruit of the size of a pea; the young plant having lanceolate, willow-like leaves. A few stocks were observed in the Sandal-wood District, the largest somewhat resembling a peach tree. The wood will hardly again become sufficiently abundant for the purposes of commerce; but hand-specimens can be readily procured here from the natives.

Boerhaavia (No. 3, bis Metia to Tongatabu). Ovolau; probably introduced.

Amaranthus tricolor? (No. 3). A showy plant. Cultivated on Ovolau, and elsewhere; having been introduced by aboriginal settlers.

Achyranthes; bis (No. 2 Metia to) Tongatabu. Ovolau, the North coast of Viti-levu, and elsewhere.

Balanophora Tannensis? (No. 1). At the roots of Ficus and other trees; frequent on the mountains on Ovolau and behind Muthuata.

Chloranthus? (No. 1). "Twenty feet high, with the trunk six inches" in diameter; leaves opposite, crenato-dentate, slightly sheathing; spikes terminal, branching. Growing "near Levuka" on Ovolau, Brackenridge.

Hernandia sonora; bis (No. 1 Samoa to Tongatabu). Growing along the sea-shore; but not abundant, and no large trees met with.

Gen. Euphorb.? (No. 1), or Celastr.? A shrub; leaves ovate, crenato-serrate, reticulate beneath; capsule 3-valved; style elongate, persistent. On the mountains behind Muthuata.

Phyllanthus; compare (No. 1) Taheiti; but seeming more woody and branching. A foot high; leaves lanceolate. Ovolau, Muthuata, and elsewhere.

——— (No. 2). A shrub, three to five feet high; leaves rather large, broad-elliptical, subcordate at base. Frequent on the Leeward portion of the Group.

——— (No. 3); perhaps distinct. Shrubby; leaves smaller, roundish, the under surface whitish. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

(Glochidium); compare (No. 2) Taheiti; leaves smaller than in the next species. "Ovolau," Brackenridge.

(———, No. 4). Ten feet high. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.—Compare the species growing on Ovolau.

(———, No. 5); distinct from the last; the leaves smaller. Ovolau.

Nov. gen. (Tanarius, bis No. 1 Taheiti to Tongatabu); compare Ricinus dioicus of Forster, but the leaves peltate. Mostly growing near cultivated ground.

(Omalanthus, bis No. 4 Tongatabu); apparently (No. 2) Samoa, the fruit being usually, but not always two-celled. Naloa, and elsewhere; chiefly growing near cultivated ground.

Euphorbia ramosissima, (bis No. 1 Paumotuan coral-islands to Tongatabu). Growing along the sea-shore.

——— nov. sp., (No. 3). A thick-stemmed tree, only six to fifteen feet high, having a few large branches, and abounding in milky juice; leaves linear-lanceolate, obtuse, mucronate; cymes terminal; capsule triquetrous. Muthuata, and elsewhere; and found on the "Island of Lakemba" by Dr. Holmes.

Gen. Euphorb. (No. 1). An upright, thick-stemmed shrub; ornamental, having smooth, lanceolate leaves; upright spikes. Ovolau, at the elevation of three hundred feet, frequent.

Gen. Euphorbiac. with glands at base of leaves, (No. 1). A shrub, two to four feet high; leaves ovate, serrate, long-petioled, having two pedicelled glands at base; flowers solitary, or sometimes in lax, few-flowered racemes. Growing on the North coast of Vitilevu.

Aleurites triloba, (bis No. 1 Metia to Tongatabu). Naturalized, but not abundant; in seeming accordance with the restricted use of tattooing.

Ricinus communis? (No. 1). Cultivated by the natives, and the seeds used as a substitute for candles. (The plant introduced by aboriginal settlers).

Codiæum variegatum, (No. 1; bis Samoa to Tongatabu). Frequent around the dwellings of the natives; having been introduced (by aboriginal settlers).

Acalypha (No. 2). A shrub, "six to eight feet high;" leaves broad-ovate, serrate, deep red; spikes pedunc. "In cultivated ground near Rewa," Rich.

——— (No. 3); leaves broad-lanceolate, softly pubesc. Rewa, and elsewhere; frequent.

——— (No. 4); leaves broad-cordate. On the low coral-islet of Nukulau.

——— (No. 5). A shrub; leaves round-cordate, deeply crenate, purplish. Levuka, on Ovolau.

——— (No. 6); compare the last sp., but more pubescent. "Island of Oneata," Dr. Holmes.

——— (No. 7). A "shrub, twelve feet high;" leaves very tomentose, almost lanate, on both sides. "Ovolau," Brackenridge.

———? (No. 8); compare Urticaceæ?. Leaves alternate, petioled, broad-lanceolate, serrulate; aments small, axillary. Growing at Mba.

Excæcaria; bis (No. 1) Tongatabu. Dense aments. Frequent along the sea-shore.

Croton? (No. 1). "Thirty feet high;" leaves broad-lanceolate, petioled; fruit small and numerous, tomentose, in axillary racemes. "Ovolau, at the elevation of fifteen hundred feet," Brackenridge.

———? (No. 2); perhaps a second species; smooth. "Ovolau," Brackenridge.

Gen. Crotonoid, (No. 1). A shrub; leaves broad-lanceolate, sinuato-serrate, cordate or auriculate at base; dicœcious?; the male flowers clustered at intervals on long filiform racemes. Ovolau.

——— (No. 2); congeneric with the last. A shrub; leaves ovate, long-petioled; minute spikes. Ovolau.

Gen. Croton-like, with sub-opposite leaves, (No. 1). Arborescent, four to twenty feet high; leaves sub-opposite, petioled, cordate, the under surface white. Frequent on the Leeward portion of the Group.

——— (No. 2); a second species? A shrub; leaves opposite, or verticillate in threes, ovate, acute, petioled. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

Gen. Antidesmoid? (No. 3). "A tree, twenty feet high," the young branches pubescent; leaves alternate, ovate, acuminate, integerrim.; long-branched racemes or panicles arising from the old wood; sepals four?, petals none. "Ovolau," Brackenridge.

Elatostema (No. 7); a seventh species. Much branched; leaves small, with large crenatures. On the mountains on Ovolau, at the elevation of fifteen hundred feet.

——— (macrophylla, Lesson?, No. 8); an eighth species. Resembling New Zealand sp.; leaves large, pilose. Frequent on the mountains on Ovolau.

——— (No. 9); a ninth species. Shrubby; leaves short, rather entire, hirtell.; capit. axillary. Ovolau.

——— (No. 10). Habit of New Zealand sp., but the flowers panicled. Ovolau.

———? (No. 2). Ten feet high; the leaves scattered, more linear, a foot long by three-fourths of an inch wide, the foliaceous substance interrupted at intervals to the midrib; no flowers. Ovolau, in cultivated ground; introduced (by aboriginal settlers).

Ficus; bis (No. 8 Samoa to) Tongatabu. A tree, thirty to fifty feet high, with orange-colored pisiform fruit. Planted around dwellings, Naloa, Ovolau, and elsewhere.

Gen. Urticac., the stinging tree, (compare No. 1 Samoa). Entirely smooth; the leaves large, ovate, serrate. A single spreading tree, thirty feet high, with the trunk a foot

Sciophila?; compare (No. 1 Metia to Samoa). Ovolau.

(Epicarpurus, No. 2; recorded as) nov. gen. Elatostemoid; a congener of the Samoan sp. A tree sixty to seventy feet high; flowers umbell.; the fruit larger. On the mountains on Ovolau.

(———?, No. 3); perhaps congeneric with the preceding. A "small shrub," resembling a diminutive Ficus; leaves alternate, panduriform, or irregularly incised, a deciduous stipule at base; fruit solitary, minute; two styles. "On the North coast of Viti-levu," Rich.

Antiaris (No. 1); compare upas of Timor. "A tree, forty feet high;" calyx pubescent, open; styles two, or a single one deeply furcate. "Ovolau," Brackenridge.

Ficus turbinata, Forst.; bis (No. 6 Samoa to) Tongatabu. Frequent in woods.

———; compare F. turbinata, but pedunc., with two bracts at origin. Leaves large, inequally cordate, with strong nervures; fruit dull-orange, as large as a cherry. "Savusavu," Brackenridge.

———; bis (No. 7 Samoa to Tongatabu); the lofty species with the trunk consisting of entwined roots. Growing along the sea-shore; single trees observed on the low coral-islet of Nukulau, on the North coast of Viti-levu, and on the islet at Muthuata.

———; compare (No. 9), the rambling tree of Tongatabu. Smooth inequilateral leaves, the under surface becoming rusty in drying; fruit long-pedunc. Growing near Rewa.

——— (No. 10; compare No. 4 Samoa). A small tree; leaves inequally cordate at base, the under surface tomentose; fruit very tomentose, or setose. Ovolau.

——— (No. 11). A shrub; leaves rough, cordate at base; fruit oblong, covered with hairs. On the "mountains on Ovolau," Rich.

——— (No. 12). Four to seven feet high; leaves inequally cordate at base, entirish, with a waved margin; fruit peduncled, of the size of a small cherry, and proving edible. Frequent and indigenous, but growing often in cultivated ground. Ovolau, Mba, and elsewhere.

——— (?). A shrub; leaves linear-lanceolate, with sometimes one auricle at base. "North coast of Viti-levu," Rich.

——— (No. 13). A large-leaved tree, thirty feet high; fruit small, and on short pedicels. (Ovolau).

Nov. gen. near Ficus, (No. 1). A shrub; the fruit large, plaited, and purple. Frequent in woods, on Ovolau and elsewhere.

——— (No. 2); congeneric?. Leaves one to two feet long; fruit inferior, with appearances of five sepals and small petals?. "Ovolau." Brackenridge.

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in diameter, planted near the mbure-house at Levuka. The pain, from the application of the leaves, said to "recur for many days."

Broussonetia (papyrifera, No. 1, bis Metia to Tongatabu). A frequent object of cultivation; (having been introduced by aboriginal settlers).

Artocarpus incisa; bis (No. 1 Metia to Tongatabu). Cultivated, but as far as my own observation extended, not very abundantly. The bread-fruit season took place while Mr. Brackenridge remained at Ovolau; and he informs me, that "the natives distinguish several varieties, some of them of superior quality."

Urtica? (No. 3). Stinging; two to four feet high, frutescent, the stems purple; leaves coarsely toothed. Mbua Bay, and elsewhere. No specimens.

Gen. Urticac. Acalyphoid; bis (No. 1) Samoa; habit of Acalypha, but (Urticaceous seed). Annual, herbaceous, a foot high. Rewa, and elsewhere; growing in cultivated ground.

Gen. Urticoid, (No. 3.; compare No. 1 Taheiti). Woody; leaves with the under surface white toment.; axillary small panicles or cymes. Ovolau.

Urticoid; compare (No. 1) Samoa. A shrub, eight to twelve feet high; leaves inequally-paired, a large leaf with a small one, alternately compensating; axillary fascicles. Frequent on Ovolau.

Bœhmeria (No. 6). Six to ten feet high; leaves trinerved, inequilateral; aments two feet to three and a half feet long. On the mountains on Ovolau, at the elevation of fifteen hundred feet.

——— (No. 7). Ten to fifteen feet high; leaves broad-ovate, sub-cordate; capit. in long aments. Muthuata, at the elevation of one thousand feet.

———? (No. 8). A shrub; trinerved leaves; long compound racemes. "Ovolau," Brackenridge.

——— (No. 9). "Twenty feet" high; leaves large, cordate, reticulate, pubescent; ament of glomerul. "Savu-savu," Brackenridge.

Boehmeria-like, but the leaves alternate, (No. 1). Leaves petioled; aments consisting of strings of capit. "Island of Fulari," Dr. Holmes.

Procris? (No. 4). "A shrub;" leaves larger than in the next plant, long-petioled, the under surface white; flowers panicled. "Ovolau," Brackenridge.

(Gen. Morus-like); bis (No. 1) Samoa to Tongatabu. Frequent; the leaves, mixed and infused with those of Sida and Convolvulus pes-capræ, are "used by the natives to procure abortion."

Celtis; compare (No. 3) Tongatabu. Leaves pubescent and scabrous.

——— (No. 4). "Twenty feet" high; white pubescence on petioles and young stems; fruit subsessile. "Savu-savu," Brackenridge.

Gen. Urticac. (with Sterculioid leaves); bis (No. 1) Tongatabu. A thick-stemmed low tree, thirty feet high with the trunk two feet in diameter, and a few coarse branches; leaves smooth, long-petioled, subcordate, entire; flowers minute, in peduncled cymes at end of the branches; stamens four. North side of Viti-levu; growing on the sea-shore, and clearly indigenous.

Piper; compare (No. 4 Samoa to) Tongatabu. A shrub, three to five feet high; leaves cordate, with about seven nervures; the young spikes white. Ovolau, and elsewhere; frequent.

——— (No. 7). A vine; the flowers not seen. Climbing among forest trees on Ovolau, but not very conspicuous.—Apparently the same species at Muthuata, the leaves broad, subcordate.

———; bis Samoa. The variety with undivided leaves is well known to the Feejeeans, and was seen under cultivation at Muthuata and in other places; owing perhaps to intermediate varieties, the line of separation was not as well-defined as in the Samoan Islands; but the leaves continued mostly entire.

Piper (methysticum; bis No. 6 Samoa to Tongatabu); the cava pepper. Roots stored by the natives; the plant not seen in the living state.

Peperomia (No. 6); pubescent; simple-leaved. Muthuata, and elsewhere; frequent
——— (No. 7); a second species. Smooth; entire-leaved. "Ovolau," Brackenridge.
——— (No. 8); a third species. Smooth; the leaves larger. "Ovolau," Brackenridge.
——— (No. 9). Minute; leaves radical, petioled, round-elliptic. "Ovolau," Brackenridge.

Nov. gen. Casuarinoid, (No. 1). A tree, fifty to sixty feet high, with a tolerably straight trunk; the extreme articulations a fourth of an inch long, 4-sulcate; cones much like those of Casuarina, but larger. Seen only in the tract of country back of the Middle village on Mbua Bay.

Dammara nov. sp., (No. 1); the leaves seeming broader than in the New Zealand sp. A single young stock, twenty feet high and bearing male flowers, observed on the mountain-summit behind Muthuata, at the elevation of two thousand feet. On other mountains, the tree may probably attain large dimensions: the resin, which entirely resembles the New Zealand kind, is used by the natives for glazing pottery; and timber suitable "for spars" was spoken of by residents.

(Gen. Podocarpoid, No. 1); a congener of New Zealand and Australian species, and near P. elongatus?. Arborescent, becoming a small tree, twenty feet high; leaves alternate, lanceolate, two to three inches long, having a midrib but no lateral nervures; no flowers. On mountain-summits on Ovolau, at the elevation of 2000 feet.

Gen. incert. with sessile fruit, (No. 1). A shrub, twelve feet high; leaves alternate, coriaceous, broad-lanceolate; obtuse; large, green, sessile fruit. Ovolau, growing along the sea-shore.

Gen. incert. with Prinos-like leaves, (No. 1). A tree, twenty-five feet high; leaves alternate; racemes, below the leaves, of obovoid drupes as large as cherries, each containing a single large nut. In the Sandal-wood District.

Gen. incert. with solitary berries, (No. 1). A shrub; leaves alternate, lanceolate, entire; calyx five-fid; berry solitary, pedicelled. Muthuata, at the elevation of fifteen hundred feet.

Gen. incert., Laurus-like but the calyx 5-parted, (No. 1). A tree, twenty feet high; leaves scattered, denticulate. Ovolau.

Halophila ovata; bis (No. 1) Samoa (to Tongatabu). Marine; growing in sea-water on the coral-shelf, but not abundant.

Nov. gen. Zosteroid; bis (No. 1) Tongatabu. Cylindrical leaves; no flowers. Marine; growing in sea-water on the coral-shelf, but not abundant.

Ruppia? (No. 1, compare United States, Peru, and R. Antarctica of Gaud); habit of Potamogeton marinum. Marine; growing in sea-water around Ovolau, but rare.

Casuarina equisetifolia, (No. 1, bis Metia to Tongatabu). A tree, twenty to forty feet high; male aments chiefly axillary. Abounding on the barren upland of the leeward portion of the Group; (seeming at home, and perhaps really indigenous).

Cycas circinalis, (No. 1, bis Tongatabu). Sometimes ten feet high; and producing fruit. Growing in cultivated ground, and also in wild situations as high up as fifteen hundred feet on the mountains.

Lemna (No. 1). Abounding in taro ponds, at Rewa, Mbua Bay, and elsewhere; (having been introduced by aboriginal settlers).

Gen. Neottioid; compare (No. 1 Samoa). Two to three feet high; acute leaves; green flowers. Near Rewa, and elsewhere.

———; compare (No. 2) Samoa. Leaves with a white midrib; small flowers. On the mountains on Ovolau.

Gen. near Neott., (No. 1). Humble, only six inches high, and tenderly herbaceous; flowers rather large, yellowish-white, a sack at the base. Frequent on the mountains on Ovolau, from the elevation of one thousand feet to that of two thousand.

———, (No. 2); perhaps a second species, more hairy. On mountain-summits on Ovolau, at the elevation of two thousand feet.

Pterocheilus, (compare No. 1 Samoa to Tongatabu). Leaves inequilateral. Ovolau.

Nervilia; bis (No. 1) Samoa to Tongatabu. Ovolau, and elsewhere.

Nov. gen. Malaxis-like, (No. 1). Two to two and a half feet high; four or five leaves at the base of the stem; flowers small, yellowish-green. Naloa.

Bletia; bis (No. 1) Samoa to Tongatabu. In clearings, and elsewhere; frequent.

——— (No. 2); possibly distinct; the flowers paler, whitish. Growing on the mountain-summit behind Muthuata, from the elevation of fifteen hundred feet to that of two thousand. Figured by Mr. Agate.

Gen. Orchioid, with axillary racemes; bis (No. 1) Tongatabu. Frequent on Ovolau.

Gen. Orchioid, with nodding racemes; compare (No. 1) Tongatabu. Large purple flowers; capsule elongate, sulcate. The specimen, dropped by some native, was found by Mr. Peale in the pathway at Naloa.

Calanthe (No. 2); compare Tongatabu; but seeming distinct. Leaves two feet long; flowers very large, no spur. "Ovolau," Brackenridge; and at Mbua Bay.

Gen. Habenarioid, (No. 1). Three feet high; leaves lanceolate; flowers with a long spur; filaments perhaps belonging to lower lip. "Ovolau," Brackenridge.

Dendrobium-like, but growing on the ground; bis (No. 1) Tongatabu. Leaf-stalk bulbous at base, flower-stem separate. Ovolau.

Gen. Fernandesioid, (No. 1). Growing on the ground; leaves striate; bifarious bracts. "Ovolau," Brackenridge.

Robiquetia (No. 1). Remarkable in this Tribe for being a vine, climbing like Freycinetia around the trunks of trees. "Ovolau," Brackenridge.

Gen. "Vanda-like," (No. 1). Flower-stem opposite to leaves; branched spikes; acute-ribbed fruit. "Ovolau," Brackenridge.

Canna (Indica); bis (Taheiti to Tongatabu, and No. 1 Brazil and Lower Peru); scarlet-flowered. Cultivated for ornament; said to have been introduced by trading and colonial Whites; and in fact, the plant was termed "papalangi" or "a foreigner" by the natives.

Zingiber (zerumbet, No. 1); bis Samoa (to Tongatabu). In pathways and cultivated ground.

Curcuma; bis (No. 1 Taheiti to Tongatabu). Growing often in wild situations; as on the hills of the North side of Viti-levu.

Musa paradisica; bis (No. 1 Metia to Tongatabu); the banana. Abundantly cultivated; (having been introduced by aboriginal settlers).

———; a distinct variety, or perhaps species?. Leaves appendiculate or caudate, the

Oberonia nov. sp., (No. 5). Stem flexuous; fruit crowded. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

——— nov. sp., (No. 6). Habit of Aletris farinosa; leaves a foot long, no leaf-stalk. "Ovolau, on trunks of trees," Brackenridge.

——— (No. 7); fruit roughish. Rewa.

(Tacniophyllum) fasciola; bis (No. 1) Taheiti to Tongatabu. "Savu-savu," Brackenridge; also at Rewa, and elsewhere.

(——— No. 2). Roots foliaceous as in the preceding species, with in addition regular leaves four to five inches in length. On the Southern cape or headland of Mbua Bay.

(——— No. 3). Seeming allied to the last, but the roots not foliaceous. On the mountains back of Mbua Bay.

(Epidendrum?, No. 3). Having a singularly compressed gladiate stem; inflorescence terminal. Epidendric in the low submaritime grove opposite Rewa.

Dendrobium (No. 7). A congener of New Zealand sp.?; leaves broad-lanceolate, obtuse; flowers not seen. Banks of the stream running through the barren upland at Naloa.

———? (No. 8). Stem leafy, the leaves two-thirds of an inch by one fourth; no flowers. On the mountain-summit behind Muthuata, at the elevation of two thousand feet; rare.

——— (macranthum, Astrolabe?; No. 9). A stem; very large yellow flowers, which are worn on the head for ornament by the natives. Ovolau, growing on rocks and trees.

——— (No. 10); leaves narrow-elliptical, crowded, bifarious; inflorescence terminal; a short spur. "Ovolau," Brackenridge.

———? (No. 11); flowers deep orange; a long stout spur. Frequent on mountain-summits on Ovolau.

——— (No. 12). Stems one to two feet; leaves lanceolate, five inches by half an inch; flowers few, axillary, smaller, having an obtuse sack. "Ovolau," Brackenridge.

Gen. Orchid. large-fruited; compare (No. 2) Samoa. Stem bulbous at base; leaves ribbed, large; capsule very large, alate, or deeply costate. On the mountains on Ovolau.

(Desmotrichum?, No. 1). Stem dilating into a long striated bulb; leaves by twos or threes; inflorescence terminal; large red flowers; capsule papilloso-filamentous. "On the mountain behind Muthuata, at the elevation of about fifteen hundred feet," Rich.

Gen. Orchid. with branching stems, (No. 1). Two to three feet high, stems leafy, some-

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under surface glaucous; spadix nodding; flowers semiverticillate, or in half-whorls as in M. paradisica; the fruit somewhat more costate, farinaceous when cooked, but not seen in the ripe state; no seeds. Abundantly cultivated, and the fruit gathered while green to ripen afterwards in dwellings. Naloa, and elsewhere; (introduced by aboriginal settlers).

——— nov. sp.; (No. 2, bis Taheiti to Samoa). The "fehi," the "same precisely as at Taheiti," seen by Mr. Brackenridge "on the mountains on Ovolau."

Crinum (bis No. 1 Samoa to Tongatabu). Sparingly planted for ornament; and flowers brought from the "Island of Oneata" by Dr. Holmes; (introduced by aboriginal settlers).

Allium cepa, (bis Peru, United States, and No. 1 Europe); the onion. Levuka on Ovolau; introduced by trading and colonial Whites.

Dioscorea pentaphylla? (bis No. 3 Taheiti to Samoa); the "kawai." Five-leaved; capsule inferior, triquetrous; the root having a separable skin. In cultivated ground; (introduced by aboriginal settlers).

times branching; flowers in subterminal Sparganium-like capit.; capsule smooth, shining, three grooves. "Ovolau, at the elevation of two thousand feet," Rich.

Gen. Orchid. with subsessile flowers, (No. 1). Leaves distinct, in pairs, bulb at base; flowers almost sessile, large, pale-yellowish, with a sack or obtuse spur at base. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Gen. Orchid. (with ribbed leaves); bis (No. 1) Samoa. Epidendric; terminal inflorescence. "Ovolau," Brackenridge.

——— ? (No. 2); congeneric ?. Epidendric in tufts; stems two inches; leaves linear, fleshy, an inch long; capsule small. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Gen. Dendrobioid with cylindrical leaves, (No. 2); compare (No. 1) Taheiti. "Savu-savu," Brackenridge.

Gen. Dendrobioid with concealed flowers, (No. 2); a congener of Samoan and New Zealand sp. Minute, creeping, appressed; leaves elliptical. "Ovolau," Brackenridge.

Gen. Steloid, (No. 3). Leaves linear; flower-stems axillary; long racemes of very small flowers. "On mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

Gen. (Oberonioid, No. 1). Epidendric; a long terminal spike; stem one to two feet long, straight, rigid, somewhat compressed or ancipital, the flowers on two opposite sides; capsule small. On the mountain-summit behind Muthuata, at the elevation of two thousand feet.

Gen. Maxillarioid, (No. 3); compare Maxillaria. Root creeping; leaves lanceolate, a sulcate bulb at base; delicate purple flower on a separate slender stem; petals linear; capsule rather large. On the mountain-summit behind Muthuata.

——— (No. 4). Epidendric; creeping; leaves lanceolate-linear, a long sulcate bulb at

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——— alata, (bis No. 4 Samoa to Tongatabu). Abundantly cultivated; constituting the principal food of the natives. Houses for storing yams, distinguished by being built on posts, were to be seen in every village.

——— ? nov. sp., (No. 6). Leaves opposite, hastate, smooth, with about nine nervures. Planted; and also seen growing in the forest.

——— aculeata ? (No. 7). Leaves reniform, ten-nerved; stem with hooked prickles; root smaller than in D. alata, the skin peeling in rings like birch bark. Cultivated by the natives, rather abundantly; and generally preferred on shipboard. According to one account, the true "kawai."

Tacca pinnatifida, (No. 1, bis Metia to Tongatabu). The leaves more divided than usual, having linear segments. Naturalized; growing often in wild situations. Arrow-root is manufactured from this plant by the natives, and seemed to be regarded by them rather as a luxury.

Dracæna terminalis, (No. 1, bis Metia to Tongatabu). Leaves mucronate, the petiole alate. Growing near dwellings, and also in wild situations; but the natives did not appear to make any use of either roots or leaves. A large-leaved variety also met with, which might in the distance be almost mistaken for the banana plant.

Ananas (bis Taheiti to Samoa, and No. 1 Tropical America); the pine-apple. Levuka on Ovolau; introduced by trading and colonial Whites.

Commelina (No. 1, compare Samoa). Small blue flowers. Growing at Mba.

base; flower-stem separate. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

———? (No. 5). Epidendric; leaves elliptical, three inches long; flower-stem separate; large sulcate capsule. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

———? (No. 6). Epidendric; leaves linear-lanceolate, seven inches by one; flower-stem infra-axillary, or from base of stem; flowers in a raceme; capsule of medium size. On the mountains behind Muthuata, at the elevation of 1500 feet.

———? (No. 7). Very large; leaves a foot and a half, by four inches; large cluster in fork. On the mountain-summits back of Mbua bay, at the elevation of 2000 feet.

(Amomum, No. 3); compare Thalia cannæformis of Forster. Hedychium-like, ten to fifteen feet high; large white flowers; roundish fruit. On the mountains on Ovolau.

Nov. gen. Musac. (bis No. 1 Samoa); Heliconia-like. In the mountain-forest on Ovolau, clearly indigenous.

Dianella; compare (No. 1) Taheiti to Tongatabu. In open ground, at Mbua Bay and elsewhere.

Eustrephus (No. 1). Near the Australian species; capsule or berry three-valved. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Smilax (compare No. 1 Tongatabu). Leaves large, round-cordate, with a deep sinus. Ovolau, in the forest.

——— (No. 2); leaves ovate, five-nerved; flowers umbell. Mbua Bay, and elsewhere.

——— (No. 3); leaves 3–5-nerved; long umbels and pedicels. "Ovolau," Brackenridge.

(Hamelinia, No. 2); Astelia of authors. Near the broad-leaved New Zealand sp.; the flowers seeming larger. On trees, on Ovolau.

Areca nov. sp., (No. 2). Distinct from the Samoan sp., and less lofty, yet from thirty to fifty feet high; icosandrous; calyx of six scales; fruit larger, two inches, ovoid, acute, the apex terminal and not deflected. Planted at Rewa; but probably indigenous somewhere in the Feejee Islands. The fruit astringent, but eaten by the natives.

——— nov. sp., (No. 3). Fifteen feet high; fronds pinnatisect; panicle below the fronds; calyx of six bracts or sepals, disposed in two series; fruit red, two-thirds

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Cocos nucifera, (bis Paumotuan coral-islands to Tongatabu). Cultivated, but not very abundantly; two varieties distinguished by the natives; the one with brownish fruit being superior to the other in quality.

(Borassus flabelliformis; No. 1, bis Samoa to Tongatabu); the fan-palm. Planted around dwellings at Levuka.

Pandanus (bis No. 1 Paumotuan coral-islands to Tongatabu). The leaves long and narrow. Planted on Ovolau, and elsewhere.

———; possibly distinct. Fewer-flowered than the last; and the leaves shorter, broader, and slightly glaucous. Isolated trees, ten to twenty feet high, growing at short intervals, or in a scattered manner all over the unwooded portion of the Group.

(Colocasia) macrorhiza, (No. 1, bis Metia to Tongatabu). Seldom met with. (Cultivated, according to Mr. Hale, principally at Rewa; and, as the roots may remain several years in the ground, looked to by the natives as a safeguard against famine).

of an inch, the apex regular and central, not deflected laterally; kernel astringent. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Caryota (No. 2). Thirty feet high, with the trunk four inches in diameter; calyx of three bracts; corolla of three valves; flowers icosandrous. Frequent in the forest on Ovolau.

——— (No. 3); perhaps the same with the last, but the trunk only an inch in diameter; fruit small. The trunk or stem "used by the natives for spears;" and called "black bamboo" by residents.

Freycinetia (No. 4); a fourth species. The stem branching; leaves broad, with a long mucro; yellow bracts or floral leaves around the male flowers, none around the female. Frequent in the forest.

——— (No. 5); a fifth species. Also branching; the leaves narrower, acute, but not acuminate. Woods on Ovolau.

——— (No. 6); apparently a sixth species. Also branching; the leaves smaller, tenderly herbaceous. On the mountains on Ovolau.

Nov. gen. (No. 1). Habit of a giant short-stemmed Cyperus; stem triangular, only a foot high; leaves very long; fruit Pandanus-like, but nearly segregate. Marshes around the wet sub-maritime grove opposite Rewa; and in similar situations at Naloa and elsewhere.

Pothos; bis (No. 1) Samoa. Incised leaves; thick, green spadix; spatha greenish-white, deciduous. Frequent in the forest.

———; compare (No. 2) Samoa. Small lanceolate leaves.

Flagellaria; bis (No. 1) Samoa; but less frequent. Ovolau, Mbua Bay, and elsewhere.

Scleria; compare (No. 3 Samoa to Tongatabu). "Savu-savu," Brackenridge; and frequent also in other localities.

——— (No. 4); a fourth species. The fruit smooth. Barren ridges on the Leeward coast, growing in tufts.

——— (No. 5); a fifth species. The fruit beaked, and roughish. Barren ridges on the Leeward coast.

——— nov. sp., (No. 6); a sixth species. Four to five feet high; sheaths trialate. In open marshes around Mbua Bay; rare.

———; perhaps distinct from the last. Very diminutive; leaves with small divaricate acute lobes; no flowers. Along the stream that descends through the village of Levuka.

(——— Antiquorum; No. 2, bis Metia to Tongatabu). Abundantly and very carefully cultivated; streams of water being terraced at intervals, so as to form artificial pools; but as an article of diet, the natives are said to "prefer yams." An upland variety, planted in clearings in the damp mountain-forest, on Ovolau and elsewhere.

Rhynchosphora; bis (No. 1) Samoa. Ovolau, growing in taro patches; and observed also at Mbua Bay.

Eleocharis capitata? (compare Manilla, Bombay, and No. 17 Peru). Ovolau, growing in a wet taro patch; perhaps introduced.

Cyperus; bis (No. 1 Metia to Tongatabu); the glaucous species. Frequent.

Mariscus (paniceus); bis (No. 1 Metia to) Samoa. Muthuata, and elsewhere; frequent.

Kyllingia (monocephala); compare (No. 1 Taheiti to) Samoa.

Panicum; bis (No. 2) Samoa to Tongatabu. Normal; small-flowered. Ovolau; growing in cultivated ground.

——— (No. 7). Three to four feet high; sheaths not alate; nut smooth, obtuse. Naloa.

Nov. gen. Caric. (No. 1); but habit of Scirpeæ. Caryopsis beaked. Frequent on Ovolau, growing in tufts in the forest.

Fimbristylis (No. 4). A foot high; leaves pubescent, the older ones smoother. Naloa.

——— (No. 5); long linear leaves. Ovolau.

——— (No. 6); apparently a third species; the leaves broader. Ovolau.

Trichelostylis; bis (No. 1) Tongatabu; Scirpus of authors. Flat-stemmed. Ovolau.

Abildgaardioid; bis (No. 1) Tongatabu. Muthuata, and elsewhere; abundant.

Eleocharis (No. 1, and compare Peru and Australia); near New Zealand sp. Stem articulate, three to five feet high. Growing in water, at Rewa and elsewhere.

——— (No. 2); resembling the preceding, but the stem not articulate. Three to four feet high. Mbua Bay, and Naloa.

Cyperus (compare No. 3 Samoa); near our N. American C. strigosus. Mbua Bay.—Apparently the same species found there by Mr. Brackenridge, having the spikelets subulate and flexuous.

——— (No. 4). Normal; nine inches high; spikelets compressed, having about fourteen florets. "Ovolau," Brackenridge.

(Gen. Paniceæ?); bis (No. 1) Samoa to Tongatabu. Pubescent. Creeping in maritime sands; Muthuata, and elsewhere.

Gen. Digitarioid, with long awns, (No. 1). Woods on Ovolau.

Digitaria; compare (No. 2) Taheiti (to Tongatabu). Frequent in the unwooded districts.

——— (ciliaris); bis (No. 3) Tongatabu. Stems and sheaths hairy. Abounding on the Leeward portion of the Group.

Orthopogon; compare (No. 1) Taheiti to Tongatabu. Frequent in woods, at Mba and elsewhere.

———; bis (No. 2) Tongatabu. Larger than the last, and more branched. Ovolau.

Paspalum; compare Taheitian sp. Frequent in the unwooded districts.

Lepturus; compare (No. 1 Paumotuan coral-islands to) Samoa and Tongatabu. In maritime sands on "Nemena or Direction Island," Brackenridge; and in similar localities elsewhere.

———; perhaps distinct. Growing on the hills.

———; bis (No. 3) Tongatabu. In cultivated ground, Levuka and elsewhere; also seen at Mba.

Cenchrus (calyculatus; No. 1, bis Metia to Tongatabu). In a cocoa-nut grove, on the North coast of Viti-levu.

Coix lachryma, (No. 1, bis Samoa to Tongatabu). Frequent in cultivated ground; introduced (by aboriginal settlers).

Rhapis acicularis, (No. 1, bis Taheiti to Tongatabu). Rather rare.

Bambos (bis Taheiti, and No. 1 Samoa); leaves rough, minutely serrulate; cutting. Probably introduced. In the living state, seen only near a plantation in the Sandal-wood District; but bamboo stems were in common use in all the Feejee villages.

Saccharum officinale, (bis No. 1 Metia to Tongatabu); the sugar-cane. Abundantly cultivated by the natives, and the stems seeming unusually sweet.—The degenerate slen-

Gen. Poac.; compare (No. 1) Taheiti to Samoa. Broad leaves; acute glumes. Abundant in the forest.

Stipa? (No. 1). Habit of Agrostis; calyx-glumes acute, corolla awned. Muthuata.

Andropogon (No. 2); paniculate spikes. Frequent on the barren hills of the Leeward portion of the Group.

(Cymbopogon, No. 1). Smaller, with the leaves narrower than in C. schoenanthus; powerfully aromatic. On the barren hills of the Leeward portion of the Group, at Muthuata and elsewhere.

Heteropogon (No. 1); bristly glumes. Abounding on the barren hills of the Leeward portion of the group.

Chara nov. sp., (No. 1). Found by Mr. Dana "in a stream at Mba."

Psilotum (bis No. 1 Paumotuan coral-islands to Tongatabu). On the low coral-islet of Nukulau, and elsewhere; observed also, on the mountain behind Muthuata.

Lycopodium; bis (No. 4 Taheiti to Samoa). Habit of L. clavatum; two to three feet, branching. Mountains on Ovolau, Mbua Bay, and elsewhere.

———; compare (No. 7) Samoa. Pendent; leaves oval, obtuse; spikes tetragonal. On the mountains on Ovolau.

——— (No. 8). Pendent; longer pointed leaves, branching spikes. On the mountains on Ovolau.—Apparently the same species growing also on Ovolau, epidendric, the leaves acute, the spikes a foot long.

———; perhaps distinct. Epidendric; the leaves narrower, pointed; larger tetragonal spikes. On the mountains on Ovolau.

——— (No. 9); leaves oval, obtuse; spikes cylindrical. Pendent on trunks of trees, on the mountains on Ovolau.

——— (No. 10). Habit of N. American sp.; fr. axillary. On the mountains behind Muthuata, at the elevation of fifteen hundred feet.

(Selaginella) Durvillæi; compare (No. 2) Samoa. Hypnum-like; upright, two to four feet high. Ovolau, frequent in the forest.

———; a second Hypnoid species. Ovolau.

Trichomanes alatum, Coquille; bis (No. 2) Samoa. Stems fascicled; frond pinnate. Ovolau, at the elevation of one thousand feet, not abundant.

——— (No. 5). Six to ten inches; appressed to the surface; much divided and curled. Mountains on Ovolau, at the elevation of fifteen hundred feet.

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der-stemmed variety has overrun much of the unwooded portion of the Group, under the form of a coarse reedy grass; which in moist situations, becomes slightly more luxuriant, with a trace of saccharine flavor; its stems, slender and very uniform in size, are much used in Feejee architecture.

(Imperata?; bis Samoa, and compare Peru). A small species, near Peruvian. Rare at Mba, more frequent at Naloa; (introduced by aboriginal settlers).

(Cymbopogon schoenanthus; No. 2); lemon-grass; having the odor as well as the flavor of lemon-peel. Growing in large tufts, branching. Planted in villages; and naturalized or indigenous around the base of barren hills at Muthuata, and elsewhere.

Marsilea; compare (No. 1) Taheiti. Smooth, large-leaved. Aquatic; growing in taro ponds.

——— (No. 6). Growing in tufts, ten inches high; multifid linear segments. On the mountains on Ovolau.

——— (No. 7). Six to eight inches high; frond tripinn., incised. Mbua Bay.

——— (No. 8). Two to five inches, creeping; frond narrow, the segments serrate. Ovolau.

——— (No. 9). Six to nine inches high, clustered; frond very broad, tripinn. "Ovolau," Brackenridge.

——— (No. 10). Habit of Todea; stipe eighteen inches, and the frond two to two and a half feet, tripinnate. "Ovolau," Brackenridge.

——— (No. 11). An inch high, with entire segments. "Creeping on rocks on Ovolau," Brackenridge.

———; possibly distinct from the last, the segments narrower. "Rocks on Ovolau," Brackenridge.

——— (No. 12); fronds simple, undivided, half an inch to an inch high. "Ovolau, creeping on rocks," Brackenridge.

Hymenophyllum (No. 3). Small, creeping, the segments broad and serrate. Ovolau.

——— (No. 4); a second species. A foot high; frond broad, the segments entire. "Mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

——— (No. 5); a third species. Six to eight inches; frond broad; segments serrulate; the involucral segments also serrulate. "On trunks of trees on mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

——— (No. 6); capsule very large. "Trunks of trees on Ovolau," Brackenridge.

Todea nov. sp., (No. 1). Three feet high, bipinn.; midrib pubescent beneath. Ovolau, at the elevation of fifteen hundred feet.

Nov. gen. Dicksonioid; bis (No. 1 Taheiti to Samoa); simply pinnate. Growing in tufts on trunks of trees, on the mountain-summits on Ovolau, at the elevation of 2000 feet.

Dicksonia? (No. 9). Growing "on the ground;" frond smooth, multipartite, 4-pinnate; sori Davallia-like, but small. "Ovolau," Brackenridge.

——— (No. 10). "Ten feet high;" stipe tomentose; frond broad, 4-pinnate. "On the mountains on Ovolau," Brackenridge.

——— (No. 11). Habit of Asplenium; tripinn., the segments cuneate; sori generally in pairs. Bank of stream in the barren upland at Naloa.

——— (No. 12). A congener of North American sp.; tripinn., the stipe paleaceous. Ovolau.

———; perhaps distinct; tripinn. Growing in the Sandal-wood District.

Davallia? pectinata, (bis No. 3 Taheiti to Samoa). I think seen here, but there are no specimens.

——— (No. 4); frond 4-pinnate; multifid, linear segments. Ovolau, Nukulau, and elsewhere; frequent.

Nov. gen. Davallioid, (No. 1). Fronds pinnate, the fertile ones separate; sori along margin. Creeping on trunks of trees on the mountain-summit behind Muthuata, at the elevation of 2000 feet.

Acrostichum aureum, (bis Brazil, and No. 2 Taheiti to Tongatabu). Abundant in submaritime marshes.

——— (No. 4); fronds ovate, entire, the fertile one separate. On trunks of trees on the mountain-summits on Ovolau, at the elevation of two thousand feet.

———? (No. 5); fronds lanceolate, obtuse, ten to fifteen inches; no fruit. On trunks of trees on the mountain-summits on Ovolau.

——— (No. 6); fronds mostly simple, lobed on the margin, and rooting at the apex; the fertile frond separate. Ovolau.

Gen. Acrostichoid, (No. 2); frond lanceolate, terminating in a fertile thread. Growing in tufts "on the mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

Schizæa; bis (No. 2) Samoa. Flabellately divided, the lobes of spikes few.

——— nov. sp., (No. 3). Sarothra-like, and six to nine inches high; the lobes of spikes numerous. Abounding in the barren upland, at Naloa and around Mbua Bay.

——— nov. sp., (No. 4). Stipe simple, bi-alate, spikes two or more inches long. "Mountain behind Muthuata, at the elevation of fifteen hundred feet," Rich.

Adiantum (No. 7); stipe scabrous; segments hairy beneath. Mountain-summit behind Muthuata, at the elevation of 2000 feet.

——— (No. 8); simply pinnate. Ovolau.

Lindsæa (No. 1); frond bipinnat. Ovolau.

——— (No. 2). Habit of Adiantum, but the stipe white. Ovolau.

——— (No. 3); frond simply pinnate. Ovolau.

———; perhaps the same with the last; frond simply pinnate; a creeping rhizoma. Ovolau.

"Didymochlæna" (No. 1); according to Mr. Brackenridge, resembling or "near D. sinuosa of Brazil." Bipinnate, seven to ten feet high. On mountain summits on Ovolau, at the elevation of two thousand feet.

Angiopteris evecta; compare (No. 1) Taheiti to Samoa. A tree-fern, having a large but short trunk; the fronds fourteen to fifteen feet long. Ovolau; growing in the forest.

——— (No. 4); apparently a second species; the fr. nearer the midrib; Marattioid, and compare Tæniitis. "Eight to ten feet high. Ovolau," Brackenridge.

Lygodium (compare No. 1 Taheiti). Frequent in the forest.

Blechnum nov. sp., (No. 2); near Taheitian sp. Ovolau.

Gleichenia; compare (No. 1 Taheiti to Samoa). In open ground, at Naloa and around Mbua Bay.

——— (No. 2); apparently a second species; narrow segments. On the mountain-summits on Ovolau, at the elevation of 2000 feet.

Nov. gen. Wallichii, (No. 1); Polypodium of authors. The nervures dichotomously dividing. Mountain-summits on Ovolau, at the elevation of 2000 feet.

(Cheilanthoid, No. 2). Habit of Cheilanthes; and also Pteris-like, but apparently no indusium. Muthuata.

Cheilanthes (No. 1); tomentose. Barren hills on the Leeward coast.

——— (No. 2); smooth; the frond more divided. Growing, with the preceding, on barren hills on the Leeward coast.

Ophioglossum pendulum; bis (No. 1) Taheiti to Samoa. Epidendric. Ovolau.

Nov. gen. Botrychioid, (No. 1). A creeping rhizoma; sterile fronds Davallia-like; fertile ones separate. "Mountain-summits on Ovolau, at the elevation of 2000 feet," Brackenridge.

Antrophyum; compare (No. 1) Taheiti to Samoa. Frond very broad. Ovolau, and elsewhere.

———; compare (No. 2) Samoa. Frond lanceolate-linear, six to nine inches. Growing in tufts on trunks of trees, on the mountains on Ovolau.

"Niphobolus;" compare Manua (in the Samoan Group). Rewa, and elsewhere.

Nov. gen.?, the shrub-fern, (No. 1). Rhizoma upright, rigid, irregularly branching, three to four feet high; with small lanceolate fronds towards the end of the branches, so as to be readily mistaken for an ordinary or normal shrub; fr. in two rows. "Mountain-summits on Ovolau," and also back of Mbua Bay, at the elevation of 2000 feet.

Polypodium phymatodes?; bis (No. 1 Paumotuan coral-islands to Tongatabu). North coast of Viti-levu.

———; compare the last, but the frond seeming less coriaceous than in sp. of coral-islands. Ovolau.

——— (No. 9). Four to six inches high; frond lanceolate; fructification in two rows. On trunks of trees on the mountain-summits on Ovolau, at the elevation of 2000 feet.

——— (No. 10). Fronds lanceolate, three to four inches high; fructification in two rows. Creeping on trunks of trees, on the mountains on Ovolau.

——— (No. 11). Two feet high; fronds pinnate, the segments dentate; fructification in two rows. On the mountains on Ovolau.

Gen. Polypodioid, with accessory scarious fronds, (No. 1). The true fronds pinnate; fructification in two rows. Forming large nests in the tree tops.

"Microsorus" (compare No. 1 Taheiti). Long lanceolate frond. Ovolau.

——— (No. 6). Two to five feet high; stipe alate; frond pinn., the segments acute. Ovolau, and elsewhere; frequent on the ground in the forest.

———? (No. 7). Frond pinn.; the pinn. broad, sessile, sinuately incised. In the deep forest, on the mountains back of Mbua Bay.

———? (No. 8); fronds bipinn. On the "Island of Munia," Dr. Holmes; observed also, in other localities.

Doodia (No. 1), compare New Zealand sp.. Ovolau, and Naloa.

Cyathea (No. 2); tripinn., the segments linear; fr. small, Gleichenia-like, crowded, and finally covering the whole inferior surface of the frond. "Mbua Bay," Rich.

———. A tree-fern; compare the last species. "Ovolau," Brackenridge.

———? (No. 3). A tree-fern, twenty feet high. Mbua Bay.

——— (No. 4); fr. more distant. "Mbua Bay," Rich.

Nov. gen. Cyatheoid, (No. 1). A tree-fern; fronds tripinn., the first pinnæ fertile, and mostly covered with fructification; fr. a cup, as in Cyathea. On mountain-summits on Ovolau, at the elevation of 2000 feet.

Vittaria; compare (No. 1) Taheiti to Samoa. Rewa, and elsewhere.

——— nov. sp., (No. 2); frond broad, full half an inch in width. "Ovolau, on trunks of trees," Brackenridge.

Pteris (compare No. 1 Taheiti to Samoa); near P. esculenta of New Zealand. Abounding in the open ground, at Mbua Bay and elsewhere.

———; bis (No. 2 Taheiti to) Samoa. Near P. pedata, but more divided. Muthuata.

———; compare (No. 7) Samoa (to Tongatabu). Simply pinnate.

——— Chinensis; bis (No. 8) Samoa to Tongatabu. Frequent.

——— (No. 9.) Very large; pedately branched. In clearings near Rewa.

——— (No. 10); bipinn.; the lower pinn. bipartite; segments broad-linear. "Savu-savu and elsewhere," Brackenridge.

——— (No. 11); frond bipinn., the segments decurrent, lanceolate, acuminate. On the mountains back of Mbua Bay.

——— nov. sp., (No. 12). Stem weak, sub-scandent, ascending sometimes twenty feet; frond tripinn., the segments very broad; stipe large, smooth. Mountain-summits on Ovolau, at the elevation of 2000 feet.

Nov. gen. Lomarioid, (No. 1). A vine, the stem scandent; barren fronds pinnate, spinuloso-serrate, attenuate towards the apex, the nervures all parallel as in leaf of Calophyllum; the fertile fronds separate. Twining among the trunks and branches of trees in the low sub-maritime grove opposite Rewa.

Lomaria (No. 2). On mountain-summits on Ovolau, at the elevation of 2000 feet.

——— (No. 3). Narrow pinnate frond, the segments short. Growing on the ground, on the mountain-summits on Ovolau.

———? (No. 4). Three and a half feet high; segments sessile; the fertile ones partly foliaceous as in Blechnum. On mountain-summits on Ovolau.

——— (No. 5); a fourth species. Broadest; two and a half feet high; the lower segments auriculate, clasping at base; nervures prominent. On mountain-summits on Ovolau.

Gen. Lomarioid, (No. 1). A vine, the stem scandent; the fertile fronds separate; the barren fronds Marattia-like, pinnate, with the segments entire, penninerved, petioled. "Ovolau," Brackenridge.

——— (No. 2); a second climbing species. Fronds pinnate, the pinn. simple and acuminate; the fertile fronds separate. ("Ovolau," Brackenridge).

Gen. Polybotryoid, (No. 1); with the fertile fronds separate. Epidendric, large, creeping; frond bipinn., the segments serrate, with the fructification apparently covering the whole back. "Ovolau," Brackenridge.

Thelypteris; bis Samoa to Tongatabu. Frequent in open marshes.

———; bis, (compare No. 4 Samoa); having small sori. "Island of Lakemba," Dr. Holmes.

——— (No. 6); or compare Polybotrya. Frond pinn., pinnis pinnatifid or dentate. Growing with the first-mentioned in open marshes, but rather rare.

——— nov. sp., (No. 7); or compare Aspidium. Habit of Thelypteris, but smooth stipe; frond bipinn., sori along the margin. "Island of Munia," Dr. Holmes.

(Nephrodium); bis (No. 1 Metia to) Tongatabu. Like A. exaltatum, but the rachis pubescent. Less frequent than at Samoa.

———; compare the last sp. Larger than A. exaltatum; fr. in two rows. "Ovolau, at the elevation of two hundred feet," Brackenridge.

——— exaltatum? (No. 2); entirely smooth. Mbua Bay, and elsewhere.

——— (No. 3); miniature of A. exaltatum. "On mountain-summits on Ovolau, growing in tufts on the trunks of trees," Brackenridge.

Aspidium (No. 4). Stipe paleaceous; frond bipinn., the serratures mucronate or spinescent. On the mountain-summit behind Muthuata, at the elevation of 2000 feet.

——— (No. 5). Creeping, epidendric?; fronds bipinn., six to eight inches high; sori large. Ovolau.

——— (No. 6). A tree-fern?; frond tripinn., the pinn. pinnatifid; fr. in two rows. (Ovolau).

———? (No. 7). Large; frond tripinn., the segments small; stipe rough, as in Cyathea. "Ovolau," Brackenridge.

Diplazia; bis (No. 2) the broad-leaved, proliferous sp. of Samoa. Growing at Rewa, Mbua Bay, and elsewhere.

——— (No. 6). Smaller than the last, more simple; frond pinn., the pinn. dentate. In the Sandal-wood District.

——— (No. 7); frond bipinn., in some instances tripinn., the pinn. coalescing towards the apex. Mbua Bay.

———? (No. 8). Simple, or in some instances tripartite, or even pinnate; the segments long, lanceolate. Wooded banks of a stream in the barren upland at Naloa.

——— (No. 9). Slender, weak, hairy, eighteen inches high; frond bipinn. "Ovolau," Brackenridge.

——— (No. 10). Six to eight feet high; frond tripinn. "Ovolau, at the elevation of five hundred feet," Brackenridge.

Grammitis? (No. 1). Epidendric; frond lanceolate, ten to twelve inches in length. Ovolau.

———? (No. 2). Four to six inches high; frond pinnatifid, the segments alternate; fr. along the margin. On the mountain-summit behind Muthuata, at the elevation of two thousand feet, growing in tufts on the trunks of trees.

Scolopendrioid (No. 1). Frond lanceolate, the nervures parallel; fr. larger than in Asplen. nidus. On mountain-summits on Ovolau, growing in tufts on the trunks of trees.

Asplenium nidus, (bis No. 1 Paumotuan coral-islands to Tongatabu). Frequent; growing also on the "Island of Oneata," where it was found by Dr. Holmes.

——— (No. 11), bis?. Near A. lucidum; frond pinn., the segments serrate. On the mountains behind Muthuata.

——— (No. 12); a second pinnate species; the segments less deeply serrate, and the fr. not reaching the margin. Ovolau.

——— (No. 13). Six to twelve inches; frond bipinn., the segments cuneate, dentate. Ovolau, growing in tufts on rocks and the trunks of trees.

——— (No. 14). Frond simply pinn., the segments an inch long; lines of fr. short. Ovolau, growing in tufts on rocks.

——— nov. sp., (No. 15). Fronds three feet, tripinn., the segments striate, cuneate, dentate; sori few. "Savu-savu, growing on trunks of trees," Brackenridge.

——— nov. sp., (No. 16). Habit of Adiantum; frond 4-pinnate. Rewa.

——— (No. 17). Habit of Adenophorus; three to five inches; frond pinn., pinnis incised or dissected, the segments obtuse. Mountain-summits on Ovolau, at the elevation of two thousand feet, growing in tufts on the trunks of trees.

———? (No. 18); a congener of Aspidium asplenioides. Frond tripinn., the segments dentate. Ovolau.

Nov. gen., grass-like; bis (No. 1) Samoa. In tufts on the trunks of trees; frequent.

Nov. gen., dimorphous; compare (No. 1) Samoa. Epidendric; creeping; the barren fronds Polypodium-like, the fertile ones sinuately incised. Ovolau, and elsewhere.

———; congeneric with the last. Creeping on trees and rocks; the sterile frond broad-lanceolate. Ovolau.

Cryptog. incert.; bis (No. 1) Samoa. Long back hair-like stems, tangling together the undergrowth in the forest; branching, and the branches terminating in a minute Agaric-like expansion. Frequent.

Jungermannia (No. 3). Ovolau.

——— (No. 4); compare New Zealand sp., long-tailed. On the mountain behind Muthuata.

Marchantia (compare Taheiti). On bank of stream in the barren upland at Naloa. No specimens.

(Hypnum?; compare No. 1 Taheiti to Samoa). Gen. incert. Musc.; highly ornamental. "Ovolau," Brackenridge.

——— ? (No. 3). Ovolau.

——— (No. 4); a second species. Ovolau.

——— (No. 5); a third species. Ovolau.

Gen. incert. Musc. (No. 1); delicate. Ovolau.

Gen. Musc., with large capsule; bis (No. 1) Taheiti to Samoa. Frequent in the forest.

Anyctangioid (No. 1). Capsule sessile, apparently triquetrous, like the seed of a Polygonum. "Ovolau," Brackenridge.

Dicranum; bis (No. 1) Samoa. Dendroid, or having the form of a miniature tree. In the deep forest.

——— ? (No. 2). Branching; the capsule minute. ("Ovolau," Brackenridge).

Trichostomum? (No. 1); a woolly envelope entirely covering the capsule. Ovolau.

Usnea (compare No. 1 Taheiti to Tongatabu). On the mountain behind Muthuata, and in other localities; growing on the branches of trees.

Sticta (compare Taheiti). On trunks of trees, in the moist woods on Ovolau.

——— (No. 3); perhaps a second species.

——— ? (No. 4). Thin, slate-colored, Parmelia-like, membranaceous. Ovolau.

Cenomyce (No. 2); red-tipped. Mbua Bay, growing on the ground.

Ramalina (compare No. 1 Paumotuan coral-islands to Tongatabu). Ovolau, Rewa, and elsewhere; growing on the branches of trees.

Boletus (No. 4). Small, thin. Rewa; attached to trunks of trees.

——— (No. 5); perhaps distinct from the last. Thin, blackish above and white beneath; pores minute. Ovolau.

——— (No. 6); compare B. cinnabarinus. Ovolau; and on the North coast of Vitilevu.

——— (No. 7). Small, and brown. Ovolau, on trunks of trees.

——— (No. 8). White; satiny above. In the Sandal-wood District.

Agaricus?, (No. 6); but the consistence Tremella-like. Ovolau, C. P. The specimen preserved in spirits.

Auricularia? (No. 1). Circular, thin; silky above, dull-white beneath. "Ovolau," Brackenridge.

Peziza (No. 2). Orange-colored; cup-shaped, pedunc. Rewa.

Lycoperdon (No. 2); naked at base.

——— (No. 3). Geastrum; having a stellate receptacle. Ovolau.

The above List includes about six hundred indigenous species of Ferns and Phænogamous plants: not more perhaps than one-fourth of the number that will be found growing here, whenever this extensive Group and the Interior of its two main islands shall be thoroughly examined.

5. The New Caledonian Island-Region.

On our way to Australia in the previous year, the Vincennes, as already mentioned, visited Matthews' Rock; situated near the Southern Tropic and the Southeast end of New Caledonia; and found to be "a mile in circumference," pyramidal, "and eleven hundred and eighty-six feet high."

Approaching in a boat, with Lieut. Wilkes Henry, the more gently sloping parts of the island were observed to be freshly green and grassy, covered with low herbage; giving place towards the summit, to two or three clumps of low bushes. The only spot from which these slopes seemed accessible, was encumbered with scattered points of rock projecting through the surf; but in calmer weather, a landing there could probably be effected. Lieut. Henry and Dr. Fox landed in two different places; on separate portions of a narrow beach composed of boulders or very large rounded pebbles; but under a projecting ledge, rendering it impossible to procure a single growing plant.

From the boat, the component rock appeared to be in great part a *conglomerate* of large and often loosely-aggregated pebbles; the whole traversed by a dyke broad enough to occupy a third of the island; the rock of this dyke was compact and dark-colored, being perhaps the *porphyritic rock*, specimens of which were brought off. Small crystals of *Selenite* were also brought off: and afterwards from the ship's deck, beds of crystalline *sulphur* were distinguished with the glass towards the summit of the island; also blue and green stains, probably metallic, in the compact rock.

There were no traces of coral around this small island; which is perhaps within the influence of the cool water from beyond the Southern Tropic.

6. The Hawaiian Island-Region.

Leaving the Feejee Islands on the 11th of August, 1840, the Vincennes sailed North; keeping at the same time Eastward, as far in general as permitted by the wind.

The 13th, the sky was overcast, with rain; and in the afternoon, the weather somewhat blowy.

The 14th, or the following day, was by a special order called

"Thursday, August 13th." In other words, we resumed our original Reckoning. The weather proved fine.

On the 14th, there were some rain-squalls; during the daytime.

On the 15th, the wind continued moderate.

On the 19th, we reached Gardner's coral-island; in "W. Long. 174° 40′," in the Phœnix Range, and already described.

On the 20th, we reached McKean's coral-island; in the same Range, and in "S. Lat. 3° 35′."

As the climate in the vicinity of the Equator in this portion of the Pacific, is a subject of interest, my incidental notices of the weather will be continued.—On the 21st, the wind was very high, with a slight fall of rain; the ship "heading her course."

At 8 A. M. on the 22d, the ship had advanced "about twenty miles since noon yesterday." We continued steering Southeast. The weather on the 23d being nearly calm all day; calm also throughout the ensuing night, with very heavy rolling.

On the 24th, there were rain-squalls, and a little more wind; the ensuing night being calm, with not so much rolling.

On the 26th, we reached Hull's coral-island; also in the Phœnix Range, and already described.

The ensuing night proved squally. And on the 27th, there was more of a breeze than we have experienced of late.

On the 28th, there was a tolerable breeze: but we again passed in sight of Hull's coral-island. Electrical phosphorescent balls were spoken of, as seen on the rigging in the evening.

On the 29th, there was a fine breeze; the ship sailing "eight knots, and heading nearly Northeast." Before breakfast, an island was passed to the Leeward, but too distant to be visible from the ship's deck. About noon, we reached Enderby's coral-island; situated in "S. Lat. 3° 08′ and W. Long. 171° 08′," and already described.

On the 30th, we were searching for the island seen yesterday; but before noon, bore away Southeast, with a tolerable breeze.

On the 31st, there was a good breeze; and we were steering mostly Eastward, all the way from Northeast to Southeast. At night, it was determined, to leave the Phœnix Range of coral-islands, and continue on our course to the Hawaiian Group.

On the 1st of September, the wind became very light; calm during the ensuing night.

On the 2d, there was a fine breeze throughout the day, varied by

a single squall; the ship heading her course, and continuing under sail all the ensuing night.

On the 3d, the breeze continued; the ship still heading her course. At night, the breeze slackened a little, but was tolerably fair.

About 6 A. M. on the 4th, we crossed the Equator; after passing nearly two years in the Southern Hemisphere.

On the 5th, the ship, with a moderate breeze, was still heading her course; and might even have headed farther Eastward.

Towards evening on the 6th, the sky became overcast; and the ship was "headed off," diverted from her course.

On the 7th, the ship was again heading her course. A violent squall took place about noon; towards evening, there was a calm; and before dark, a heavy rain-squall. The calm continued through the night, interrupted however by frequent squalls.

On the 8th, the calm continued throughout the day; varied as before by occasional squalls; one of which in the afternoon proved rather heavy, and was accompanied with rain.

On the 9th, the calm continued during a great part of the day; with some rain. It was only after reaching the vicinity of "N. Lat. 6°," that we encountered these calms.

On the 10th, the ship, with a good breeze, was heading her course; having attained the Latitude of "8° 20′ N. in W. Long. 161°."

From this point, the breeze continued steady; the ship for several days, heading, in general, very near her course. On the 13th, the Latitude being "13° 58′ N. in W. Long. 161° 22′."

On the 17th, the breeze slackened; and favoring a little, the ship "went about on the larboard tack, heading East-Southeast and Southeast."

After experiencing very little thunder and lightning in the Southern Hemisphere, there was a heavy cloud in the West in the evening of the 18th; attended with some lightning, that brought North America to mind; but the storm did not come near us.

At 8 A. M. on the 19th, we were "about 135 miles" from our intended port. In the afternoon, there was a calm; but the breeze afterwards again favored us.

At daylight on the 20th, Tauai and Oahu were in sight, of moderate elevation compared with other islands in the Hawaiian series; yet the nearest proving "fifty-seven miles" distant. The wind and

current were now adverse; so that only on the 23d, could we get near the land; the LEEWARD SIDE OF OAHU, which seemed a mountainous Desert, almost like Peru. Contrary to all our previous associations with Polynesia, the soil was in great part bare of vegetation. But the tops of the mountain-ridges were tinged with green, and in the middle of each dry ravine, a slender line of verdure usually extended some distance downwards.—On the 24th, the Vincennes anchored outside of Honolulu harbor.

CLIMATE. The trade-winds of the Northern Hemisphere coming from the Northeast, the Leeward side of the Hawaiian Group faces the Leeward side of the Southern Polynesian groups. The difference also between the two sides, Leeward and Windward, is much more striking than at the Southern groups; the greater aridity and greater humidity seeming to some extent attributable to the increased elevation of the land-surface.

Instead of one general all-pervading climate, there is a microcosm of local climates at the Hawaiian Islands; too local, often, to correspond altogether to the limits and distribution of the plants. The immediate environs of Honolulu are Desert; "adobes" or sun-dried bricks being in use for building: yet one end of the town, exposed to a gorge through the mountains where the trade-wind is not entirely shut off, receives showers that do not extend over the remaining portion. Immediately around Honolulu, cultivation can only be carried on by artificial irrigation; three miles up the valley, this is no longer necessary; and three miles farther, with an increase of only a few hundred feet in elevation, the superabundant humidity is a subject of complaint. Also in regard to the temperature: the cold on the lofty Hawaiian mountains proved more severe than I have experienced on other mountain-summits between the Tropics, or anywhere in the Southern Hemisphere.

In the mountain-gorge leading back from Honolulu, after a strong breeze for two days with the nights cool; the wind on the 1st of December came from the Southward, bringing towards evening a thunder-storm, announced by several distinct peals. I heard *thunder* for the second time on the ensuing 25th of February, at the elevation of 5500 feet on Mauna Haleakala; and for the third time, at Honolulu, I think in the evening of the 28th of March. Rev. Mr. Andrews informed me, that thunder takes place "only during the winter; and at Lahaina," on Maui, "about four times in each winter; but more

frequently on the high ground of Maui and Hawaii: at such times only, *hail* falls, and so inseparably, as to be called 'thunder-eggs' by the natives."

"Twenty miles" at sea under Mauna Kea, I witnessed a *lunar-bow*, in the evening of the 8th of December during a slight sprinkle of rain; a nearly continuous semicircle, destitute of the prismatic colors; and altogether resembling the *fog-bows* produced by the sun's rays, on the upper portion of Mauna Kea, and along our New England coast. A few nights previously, the *prismatic colors* made their appearance on a fleecy cloud passing near the moon; as though produced by the direct transmission of moonlight.

On the Windward flank of Mauna Kea, at the saw-mill two thousand feet above the sea at Hilo, the *evaporation* from wet surfaces on the morning of January 9th, was as plainly *visible* as in cool climates. It is true, where there are no mountains, the warm countries between the Tropics seem to be very generally free from *fogs*.

By a peculiarity perhaps unique, the Hawaiian Islands are subject to LOCAL EARTHQUAKES. These are in some manner connected with volcanic action, for they occur only in the end of the Group that contains volcanoes. Two were experienced there by ourselves; and we ascertained, that these did not extend to Oahu. We learned also, that natives born and brought up in the Western Division of the Group have manifested great astonishment on first experiencing the earthquakes of the Eastern Division.

OAHU. The Western division commences in the middle of the linear series, with Oahu; the island we first visited, landing there on the 25th of September. Though devoid of a real seat of volcanic action, Oahu has several crown-shaped hills or *coast-craters*, around its margin, the largest and most remarkable being Diamond Hill, four miles East of Honolulu. On ascending, we found the interior cup half a mile in diameter, with the encircling rim very thin, and a portion of it rugged, wall-like, and inaccessible. The rock, wherever exposed, on and immediately around Diamond Hill, proved to be *cellular lava;* rough on the surface, but nowhere presenting the slightest appearances of having issued forth in a lava-stream. All this portion of the island is strewed with blocks of cellular lava; some being even imbedded in the ancient *coral-shelf*, that adheres in remnants, twenty feet above the water, to the cliffs of the sea-coast. A second coast-crater, similar in form but smaller, is situated imme-

diately back of Honolulu, and is commonly called Punch-bowl Hill. A third coast-crater, in sight some miles to the Westward, and beyond the mouth of Pearl River, was not visited. Besides these, the remarkable *salt-lake* in the last-named vicinity was regarded by Mr. Dana as occupying one of the three basins of an "old crater;" the other two presenting also saline traces, and the whole hardly less than three miles in diameter, with the partition-ridges higher than the common encircling rim: on the Windward side of the Group, this would probably have been filled by the rains and broken through, to the washing away of all depositions and traces of salt.

The Desert environs of Honolulu present no genuine Desert plants; the area of denuded soil being very limited, both here and throughout the Group. *Tribulus cistoides*, a Zygophyllaceous plant, seemed indeed entirely at home; but the species is not peculiar to the Hawaiian Islands, and may even have been introduced through human agency. The Leeward Portion of Oahu, and of the Group generally, is thinly coated with grasses and herbaceous or subherbaceous plants; bearing the impress of aridity in their greyish color, and in the prevailing want of freshness. Grasses predominating: especially the *Heteropogon*, exclusively occupying a large proportion of the surface; giving place at intervals to extensive tracts of tufts of an *Eragrostis* three feet high. Next to the grasses, the *Waltheria* seemed the most frequent plant; and then, three or four *Sidas*, all differing from the species of Southern Polynesia; and an *Achyranthes*, a characteristic plant, remarkable for turning conspicuously yellow in drying. *Gen. Abutilon-like* with rose-colored flowers, is more rare; as also, the velutinous *Gossypium;* the *Chenopodium* having a suffruticose or even woody base; the purple-flowered *Portulaca*, and the yellow-flowered species; the clustered white-stemmed *Wedelia?;* the shrubby *Cœnotus?;* and the prostrate, small-flowered *Ipomœa*.—Six months later, on revisiting Oahu at the close of what was called the "winter" or "wet season," the Leeward side of the island presented a decidedly fresher aspect. Some tracts indeed, remaining Desert, and bare of vegetation as before. In the absence of annual plants, a crop of young *Sidas* had sprung up on portions of the denuded district, with but a slender prospect of ever attaining maturity.

Oahu contains two mountain-ridges; hardly at any point exceeding three thousand feet in elevation, and separated by a wide intervening grassy plain. One of these, the mountain-ridge of Mauna Kaala,

being entirely within the Leeward portion of the island, at once arrested attention, as promising interesting botanical ground: shutting off as by a second fence, and rendering the District of Waianai the most arid portion of the whole Group; the same, seen from the Vincennes on first approaching the land. High up along this Leeward flank of the Mauna Kaala ridge, Mr. Brackenridge and myself met with various remarkable plants that were not seen elsewhere: as, *Erythrina monosperma*, a pinnate-leaved *gen. Araliac.*, and a Pyrus-leaved *gen. Urticac.?*, three kinds of low trees, Peruvian-like in their stout swollen trunks and branches; *gen. Gouanioid*, a rambling shrub; a remarkable *gen. Convolvulac.*, having the basal portion of the stem woody, tortuous, and decumbent; *gen. Croton-like*, a shrub with attenuate serrate leaves and long filiform aments; *gen. Morus-like*, with the female florets solitary; the remarkable *Violaceous* shrubs, with flowers arising from the old wood; and a variety of other plants, mostly trees and shrubs.

The above constitutes the anomalous portion of the Hawaiian vegetable growth; the remaining and principal portion, that on the mountains and Windward side of the Group, proved unequivocally Polynesian.

The PRINCIPAL MOUNTAIN-RIDGE on Oahu extends close along the Windward side of the island. On the grassy slope back of Honolulu, at the end of some three miles and at the elevation of about a thousand feet, scattered *ferns* begin to show themselves; principally the dwarf tree-fern, *Blechnum Fontanesianum*, and tufts of a multifid Adiantum-like *Davallioid;* overshadowed by an occasional tree of *Acacia heterophylla;* though on Oahu, large full-grown trees are in general rare. Higher up, at the border of the forest-growth, *Euphorbias*, large shrubs allied to E. ramosissima, present themselves; the forest-growth itself consisting principally of small trees, and of arborescent and other shrubs. On entering, two or more *Scævolas* are frequent, rather graceful shrubs: further in, *Urticeous* shrubs present themselves, some of them peculiar forms, as *Neraudia* and *gen. Elatostemoid;* intermingled with large shrubs belonging to the *Compositæ*, as *Dubautias* and *gen. Bidens-like;* also, species of *Metrosideros*, and of *Cyrtandra;* a variety of *Coffeaceæ*, of peculiar genera, and mostly shrubs; the Hydrangea-like *Broussaisia;* the *Ilex? hexandra; gen. incert.* Cissus-like, but a branching shrub; *nov. gen. Rutac.; Plantago Queleniana*, a real forest-shrub, six feet high; and especially *Charpentiera*, which seemed almost peculiar to Oahu: *Lobelias* as yet, being

rare.—In the absence of genuine epidendric Orchidaceæ, a *Liparis*, having like our Northern species a bulb-like base, grew not only on the ground, but quite as frequently on the trunks and branches of the small trees; which were besides encumbered with a great variety of *epidendric ferns*, including also creeping or climbing *Hymenophylleæ*.—*Alyxia* vines were frequent; also, the trailing herbaceous stems of a white-flowered *Phyllostegia;* and a *Freycinetia*, rendering, in some places, the woods passable only by scrambling over its interlaced stems, that for long distances keep the traveller several feet above the ground. —In intervening spaces, the ground in the forest was chiefly occupied by *Ferns;* in great variety, and many of them of novel aspect. It should however be observed, that most of the plants just-named are variously associated in other portions of the Group, being very generally distributed.

Continuing the ascent, the rising ground everywhere leads to the mountain-crest East of the above-mentioned gorge; the highest point being at the gap, or precipitous outlet, called the Pali. This elevated position, a little beyond the eminence ascertained by Dr. Rooke to slightly "exceed three thousand feet," was visited by Mr. Brackenridge and myself on the 10th of October; and enabled us to overlook the whole Eastern section of the island; also the mountain-peaks on the West side of the gap; the distant summit of Mauna Kaala proper, alone intercepting the horizontal line of vision. The crest followed by us, being exposed and very narrow, presented the usual mountain-plants, *Hamelinia*, *Smilax*, *Metrosideros*, *Vacciniums*, and others; together with some remarkable species, not seen elsewhere: as one or two peculiar *Pittosporums; gen. Loganiac.;* a poplar-leaved *gen. Araliac.; gen. Lycioid?;* and three or four *Lobelias*, one of them yellow-flowered, and another, having its stout woody simple stem a foot in height imbricate on all sides with long coriaceous strap-shaped leaves.

Tauai or Kauai. On the 25th, with others, I went on board the schooner Flying-fish, for an excursion to Tauai. The weather continued nearly calm, until the afternoon of the 26th; when, being off the West end of Oahu, a breeze sprung up, and enabled us to reach Tauai at an early hour in the morning of the 27th.

Tauai is a loftier island than Oahu; roundish in outline, about "twenty-eight" miles in diameter, and occupied by a flat-topped mountain-mass called the "Table-land;" the wide expanse of summit ren-

dered somewhat uneven by minor undulations, yet almost everywhere as much as four thousand feet in elevation. Along the whole Southern side of the island, the descent is gradual; from the West round to the Northwest, an abrupt precipice falls directly into the sea; thence around the North side to the Northeast, the precipice falls on basal ridges and a strip of territory interposed before the sea: in the East, the Table-land seems less regular, and Mount Waialiali was described as projecting above the general level an additional thousand feet, so that from the apex, "Oahu at certain times becomes visible."

We landed at Koloa, on the Southeast end of Tauai; where, under partial Windward exposure, the surface, not so barren as around Honolulu, is covered with grasses, and affords some pasturage; adobes or sun-dried brick being already complained of, as not proving permanent.

On the 28th, our party separated: Mr. Brackenridge and myself keeping on the Southern or Leeward side of the island; which, as we proceeded, altogether resembled the Leeward side of Oahu. At the end of "fifteen miles," we arrived at Waimea; the mission-station of Rev. Mr. Whitney, where we passed the night.

On the 29th, accompanied by two native guides, we commenced the ascent: which proved extremely regular and gradual; a deep mountain-ravine containing a stream of water far below us, continuing all the way on our right. The ground was at first extremely barren; but by degrees became covered with short withered *grass;* scattered *ferns* next made their appearance; and at the end of about nine miles, we reached the first trees, in two or three patches that supply the village with wood. Farther on, trees became more frequent; accompanied by a remarkable *gen. Lobeliac.*, its stout simple stem, eight to fifteen feet high, terminating in a cluster of very long Dracæna-like leaves. At the end of "twelve miles" in all, we arrived at the Halfway cabin; situated fairly within the border of the forest, but the trees seldom attaining even medium size; consisting of *Acacia heterophylla* and *Metrosideros;* with, among the undergrowth, a frequent *Epacrideous* shrub, and a *Vaccinium.*

We stopped for the night in this uninhabited place: the weather at 5½ P.M. very slightly rainy, and the sympiesometer outside of the cabin marking the temperature of 69° Fahr., and the elevation of six hundred and fifty fathoms: and in the same position on the 30th, at 7 A.M., a slight rain falling, 72° in temperature, and six hundred and fifty fathoms in elevation.

The Table-land may be regarded as commencing here: and proceeding by a path not very clearly defined, we found the walking unpleasant, from mud and quagmires, the falling rain, and the cool temperature; the forest-growth being everywhere sufficiently luxuriant to intercept the distant view. In many places, the soil seemed of good quality; but from the failure of all attempts at cultivation, the occasional falls of snow, and the presence of some real bogs, the Table-land belongs partially at least to the Hawaiian Mountain-region, to be described presently. Natives have perished on the Table-land, in former times from exposure; and more recently, some had been "killed by bands of dogs that have run wild;" so that our route was unfrequented.

Some traces of hogs were met with, but we saw nothing of wild dogs; and in the afternoon, at the end of "ten miles," we reached the Pali, or Northern brink of the Table-land. The weather was too thick to admit of an extensive view around; but there was a fearful distance to look down. It seemed wonderful, that there should be here a practicable descent; and one, not even dangerous; though to let one's self down this immense cliff, chiefly by means of the hands, proved fatiguing.

At the base we found ourselves among cultivated ground in the Wainiha Valley; the distance to the sea-coast being estimated at "five miles;" but after twice fording with difficulty the swollen stream, and night coming on, we accepted the hospitality of the natives, and stopped at some cabins on the way.

On the 31st, after proceeding about two miles, we crossed the Wainiha near its mouth, in a canoe; we then turned Eastward, and at the end of "five miles," most of the way along the sea-beach, arrived towards noon at Hanalei; at the mission-station, where our party reassembled. The district, being on the Windward side of the island, is subject to superabundant rains, but is regarded as one of the finest in the Group. Back of the freshly-verdant grassy plain and basal slopes, the mountains in the Southeast were wooded and at first seemed lofty; but beyond them and above, was the continuous wall-like face of the Table-land.

On the 1st of November, the schooner Flying-fish made her appearance; and having received our party, sailed a little after 10 P.M.—The wind favoring, we arrived early in the evening of the 2d near Waiarua at the West end of Oahu; but Capt. Knox, being unacquainted with the place, decided to wait for daylight.—On the 3d,

our party landed at Waiarua.—On the 4th, Mr. Peale and myself walked over the barren plain or wide intervening valley, and at the end of "eighteen miles" arrived at Ewa.—On the 5th, we continued on "twelve miles" further to Honolulu.

Molokai. On the 3d of December, the Vincennes left Honolulu; and sailing Eastward passed Molokai on the 4th. Molokai, the first island of the Eastern Division of the Group, being in the neighborhood of the large island of Maui, is regarded as of only secondary importance. Yet it is more than "a long narrow ridge, sloping on one side and nearly precipitous on the other;" its line of mountain-peaks including some that seemed hardly less than three thousand feet high, with intervening pleasant and quite extensive valleys. The ancient *coral-shelf*, only twenty feet out of the water around Oahu, is according to Rev. Mr. Hitchcock, in some places around Molokai "a hundred feet above the sea-level."

Maui. Next beyond Molokai, the Vincennes passed Maui; two immense mountain-lumps rising out of the sea, connected together by a low alluvial isthmus; so low as in the night, to be sometimes mistaken by navigators for an open channel.

The Western mountain-lump has a *coast-crater*, projecting half-buried at the base of the Western slope near Lahaina: a town visited by a party from the Vincennes some weeks later. From Lahaina, our party proceeded by land South, along the sea-shore of the Leeward portion of West Maui. The vegetable growth almost exactly the same as on the Leeward side of Oahu and Tauai: thinly-scattered grasses prevailing, principally the *Heteropogon*, with a hairy *Panicum* next in frequency; here and there giving place to single herbaceous and sub-herbaceous plants, to the *Achyranthes*, the purple-flowered *Portulaca*, the velutinous *Gossypium*, the *Campylotheca?* with multifid leaves, the prostrate small-flowered *Ipomœa*, the *Dolichos* with linear leaflets and yellow flowers, and the shrubby *Wedelia?* with canescent or whitish foliage.

By degrees the coast led Eastward, and at length Northward, and at the close of day we arrived at Wailuku; on the opposite side of the mountain-lump. Our way hither was partly over the low alluvial isthmus; which, when more extensively examined, was found to contain tracts of drifting sand, and interesting plants growing thereon: as a tortuous procumbent Portulaca-like *Scævola;* a procumbent shrubby *Solanum; gen. Grewioid*, an unsightly shrub a foot

or more high; a *Nama*, remarkable in the Hawaiian Group for being one of the three or four plants that might pass for *annuals*, though I had doubts as to their duration being limited to a twelvemonth; and *gen. Durantoid*, a decumbent shrub with upright branches two to three feet high, and ornamental clusters of deep-blue labiate flowers.—The only other spot in the Hawaiian Group where I met with drifting sand, was near Waimea on the Leeward side of Tauai; and the locality was equally signalized by the presence of this *gen. Durantoid*.

West Maui is traversed by a mountain-defile; leading back from Wailuku, and subsequently examined by Mr. Brackenridge and myself. The rock proved to be chiefly *conglomerate:* as though West Maui stood in the same relation to East Maui, as Mauna Kea does to Mauna Roa. Most of the way, the acclivity on either hand was inaccessible; rising above us one to two thousand feet, more or less precipitous, and in every practicable situation richly clad with luxuriant forest-growth. Towards the Leeward outlet, the climate rather suddenly became arid; and on looking upwards, I was surprised by a display of CLIFF-PLANTS; species expressly adapted to cling to the face of precipitous rocks: as a remarkable *Lobelia*, having its stem swollen at base and covered with leaf-cicatrices so as to resemble certain fossil coal plants, afterwards tapering, and at the end of four to eight feet crowned with deltoid Curcas-like leaves; a yellow-flowered Vitis-leaved *Hibiscus*, abundantly intermingled; and a peculiar species of *Wedelia;* three plants we met with only in this locality. In all the various countries visited by myself, I have seen cliff-plants only on Madeira, to some limited extent on continental Europe, and in this recess in the Hawaiian Group. It should however be observed, that the *Gunnera*, which in various parts of the Hawaiian Islands clings to the edge of lofty precipices, is perhaps also to be regarded as a cliff-plant.

Our party left Wailuku in the morning, and after passing the alluvial isthmus, commenced the ascent of Mauna Haleakala; another name for the enormous mountain-lump of EAST MAUI. The ground everywhere rose gradually; and our route being on the dividing line between Windward and Leeward, the country we traversed was neither barren nor fairly wooded; but there were woods at no great distance in the Northeast. An hour before sunset, we arrived at some plantations and a sugar-mill, and stopped for the night at Mr. Maclane's house: the temperature at 7½ P.M., being 67° Fahr., and the barometer marking 28·424 inches. The *Osteomeles* was observed to be rather frequent

in the vicinity; a shrubby *Cœnotus?* having rayed and larger flowers, made its first appearance; and in the occasional *Euphorbia* groves, a stock was seen fairly arborescent, full fifteen feet in height, with the stem four inches in diameter.—The next day, we continued the ascent; proceeding over an open country; the rock rarely exposed, but proving *basaltic* as before, and rather compact, devoid of very obvious granules of either chrysolite or augite. At 1½ P.M., a heavy rain commenced, and we took shelter in a cave; where, as the rain continued some hours, we decided to remain for the night: the temperature outside at sunset, 49° Fahr., and the barometer marking 24·978 inches; the climate rather moist, as appeared from the ground being completely covered with grasses and freshly-verdant vegetable growth. The elevation, it will be perceived, proved only about fifty-five hundred feet; yet of the thirty-seven species of plants collected around this cave, all but the following three belonged to the mountain-region: the *Acacia heterophylla*, hardly becoming a tree; a *Pteris* resembling P. aquilina; and an orange-fruited *Coffeac*. The coolness of the temperature, and the *frost* covering leaves and grass on the following morning, seemed to afford an explanation.—We left the cave just after sunrise; and at the further elevation of about five hundred feet, bushes of *Santalum* or sandal-wood began to show themselves, continuing rather frequent in barren situations as far as the elevation of 6500 feet. To this limit, the country was green; but the ground now began to be stony; while farther along the Northern flank of the mountain, were woods and ravines; where the limit of trees was subsequently ascertained by Mr. Brackenridge and myself, to be at 6700 feet. The description of the upper portion of Mauna Haleakala, will be given in the account of the Volcanoes and Mountain-region.

The Windward flank of Mauna Kea. Returning now to the Vincennes, on her way from Maui Eastward. At nightfall on the 8th of December, we were "twenty miles" from what seemed to be a long and continuous ledge of highland, for I had no suspicion at the time, that this was the celebrated Mauna Kea.

On the morning of the 9th, the Vincennes having reached the entrance of Hilo harbor, daylight brought a widely-extended and magnificent scene. The land rising evenly and gradually, luxuriantly verdant, and chiefly unwooded for the first three miles; the forest next extending along in a wide belt, with many myriads of trees

brought into view at once; beyond the forest, the ground continued rising gradually all the way to the clouds, and after an interval, peered out above them in a broad uneven summit brushed with snow. This unevenness imparted to Mauna Kea some faint resemblance to a peak of the Andes; but the more distant gentle arc-like Mauna Roa, also in sight, could not with all the aid of the imagination be conjured into a mountain; in the absence of steepness, the very vastness of these mountain-masses deprived them of an imposing presence. At the base in front, a minor object hardly attracted notice in the landscape: a *coast-crater*, maintaining connection with the other islands of the Group; and except in being triple, resembling the coast-craters on Maui and Oahu.

On landing, on the 10th, the FOREST was found to commence very regularly about "three miles" from the sea, and at the elevation of "fifteen hundred feet." The trees being of large size, this proved a tract of real forest, and the only one in the Group; extending, twenty miles or more in width, along the whole Windward flank of Mauna Kea. I was surprised therefore to find this forest composed of but two kinds of trees; the "ohia" or *Metrosideros*, and the "koe" or *Acacia heterophylla;* the first occupying almost exclusively the inferior portion, and in the upper portion the Acacia predominating. The trees, very generally sixty to eighty feet high, with the trunk averaging three feet in diameter, often reminded me of our tracts of White oak; the Metrosideros having a continuous central trunk with minor lateral branches; the Acacia being also very similar in aspect, though more inclining to separate by large branches into a spreading summit. The "koe" seems the loftiest tree of the Acacia tribe, being in one observed instance ninety feet by five; and of the species of Metrosideros, the "ohia" is perhaps equalled in dimensions only in New Zealand. By a peculiarity remarked in the "ohia," roots are occasionally given out some yards above the ground, after the manner of species of Ficus.

The Hawaiian *palm*, flabellate-leaved and "twenty-five feet" high, has been found growing in only one locality; quite limited, and situated, according to Mr. Brackenridge, "about ten miles" from Hilo in the midst of this forest.

On entering the forest, the *Convolvuli* soon disappear; and a *Freycinetia* is seen in all directions, climbing to the tree-tops, and further conspicuous from its orange-colored floral leaves. The undergrowth

is tangled with Ferns; with a *Gleichenia*, more or less sub-scandent, and often fairly climbing; and a *nov. gen. Polypodioid*, climbing in an anomalous manner, the frond being prolonged indefinitely, so as to creep centipede-like upwards, forcing a way by means of the recurved segments. A *Marattia* abounds on the ground, together with a *Nephrodium* resembling *N. exaltatum*; and, for a long distance, these and other Ferns are intermingled in such profusion as to barely admit of the presence of a few scattered *shrubs* and *trailing Labiatæ*. On the trunks, and above on the branches of trees, *epidendric ferns* continue frequent and in great variety; and after a few miles, the undergrowth becoming less dense, the forest seems filled with a magnificent display of tree-ferns: but on close examination, the seeming trunk of the *Pinonia* is found to lack solidity; sustaining itself solely by a dense outer coating of fibrils or rootlets, that have enveloped some slender-stemmed shrub; or in other instances, have spread out against a tree; or, when several stocks unite around some slender support, forming what seems to be a single large trunk branching and giving out separate crowns of fronds.

In ascending Mauna Kea, Mr. Brackenridge and myself, at the close of our first day's journey, encamped about halfway through this forest. Several *Metrosideros* trees were here finely in bloom; showing, that a universal development cannot take place; such a display of scarlet would redeem these islands from the complained of "dearth of flowers." The Freycinetia had disappeared; and the undergrowth was less entangled, yet consisting chiefly of *Ferns; Peperomias* continued frequent, growing unexpectedly on the ground, and one species, two or three feet high, seeming a substitute for the Pipers of Southern Polynesia; among the *Lobelias*, one species became a real tree, observed forty feet high, but having a slender maple-like trunk and only a few long branches. Various trailing *Labiatæ* made their first appearance; and the same trailing habit of growth was observed in other Northern forms around, all of them more or less herbaceous; in a *Phytolacca;* a *Rumex* ascending trunks of trees; and a *gen. Silenoid*, twining for several yards around their base. A yet more anomalous habit was presented by *gen. Epacrid.* and a *Vaccinium;* stout shrubs, five to fifteen feet high, that had become *epidendric;* in this deep and dripping forest seeking exposure high up in the tree-tops, in company with the legitimately epidendric *Hamelinia*.

At noon on the following day, we reached the first inhabited cabin

in this forest; and found there some natives engaged in "drying beef." The elevation, in the absence of means of direct measurement, being estimated at less than 5500 feet, we were surprised to hear of water *freezing* during the previous night; but continuing on, the effects of frost were here and there obvious in the blackened tips of the fronds of a tender fern; the circumstance being evidently of rare occurrence. Towards sunset, we arrived at the first opening or grassy space, and encamped there for the night. The trees around began to wear the aspect of mountain-exposure, as yet not very much dwarfed, but gnarled and moss-clad. A mile or two beyond, on the following morning, some variety was found to exist among the trees: the *Myoporum* or "false sandal-wood," being frequent, and sometimes forty feet high with the trunk ten inches in diameter; the *Aralia? trigyna*, also frequent, and fifty feet high by two and a half feet in diameter; *Ilex? hexandra*, elsewhere only a shrub, but here a tree, forty feet by two feet; *gen. Rutac.*, a tree of equal dimensions; as also *gen. Ardisioid*, and *gen. Ixoroid?;* the orange-fruited pubescent *Coffeac.?* being sometimes twenty feet by nine inches: an *Arceuthobium* besides presented itself here and there, parasitic on the tree-tops. In many respects, this marginal portion of the forest seems to belong to the Mountain-region: the change in the undergrowth is very decided; the red-flowered *Rubus* continued indeed all the way from the commencement of the forest; but there was now present in addition, a *Cardamine*, *Carices*, and a different set of *Ferns;* an *Aspidium* with the stipe conspicuously paleaceous, occupying in radiated tufts the greater portion of the woodland shade; giving place at intervals to another *Aspidium*, remarkable for the rectangular disposition of the divisions and subdivisions of its spreading fronds. The forest ceases abruptly; the margin being almost everywhere well-defined, and extending horizontally at the estimated elevation of about 6700 feet; the upper limit of the forest on Maui.

Two days had been occupied in ascending through the forest; but with increasing steepness towards the West, the breadth diminishes; so that in returning down the mountain in this direction, we were enabled to cross the forest in a single day. Halfway through, by this second route, we met with stocks of the red-flowered *Rubus* that were fairly arborescent; thirty feet high, with the smooth slender trunk five inches in diameter, but continuous throughout and gradually tapering, after the manner of a normal raspberry. *Lobeliaceæ* of rank

foliage and coarse herbaceous flowers also have a home in the depths of the forest; a fact elicited by the keen eye of my companion, Brackenridge, who from the most unexpected situations produced species after species, our rapid descent seeming alone to set a limit to the number.

On reaching the UNWOODED BASAL PORTION of Mauna Kea, we found ourselves "between twenty and thirty miles" Westward of Hilo; but more than a day's journey distant; the slope being furrowed by deeply-sunk ravines, depressed in some instances a thousand feet, so that travelling consists of descending and ascending all the way, and becomes excessively fatiguing: the sea-coast, except at the mouth of these ravines, being a lofty, abrupt precipice. The forest keeping as much as three miles from the sea, the intervening space was freshly verdant, covered with a dense and almost matted growth of grasses: *Lepturus?* prevailing; but *Digitarias* of perhaps more than one species abundantly intermingled; together with *Rhapis aciculatis*, annoying from its frequency; an *Andropogon;* and one or more *Cyperi:* in short, the same grassy sward that covers the Windward side of Oahu and Tauai, and makes its appearance at a certain elevation on the Leeward side, where the climate begins to become moist.—"Seven miles" from Hilo, the lofty precipice facing the sea terminates. At this point also, a *coast-crater* makes its appearance; much resembling the one at Hilo, and in like manner triple.

CHARACTER AND COMPOSITION OF THE VEGETABLE GROWTH. Thousands of miles away from any other rocky shore, the Hawaiian Islands hold the most isolated position on the Globe: presenting at the same time, much land-surface, and immensely-elevated mountains. It might therefore be supposed, that the productions would be of an independent character, neither American, Asiatic, nor Australian. Examination discloses, indeed, independent features, some of them very striking; but it is soon perceived, that the flora is altogether Polynesian. Peculiarities, however, are so numerous and strongly marked, that the Hawaiian flora deserves to be placed in opposition to that of all the Groups of Southern Polynesia.

The mangroves, and the submaritime trees and shrubs of Southern Polynesia have disappeared; and the forest commences everywhere at a distance from the sea-margin. On the humid Windward side of the Group, this does not seem readily explicable: the thickets of *Paritium tiliaceum*, the exceptional submaritime tree remaining, being equally

removed inland to the commencement of the line of forest.—Cunoniaceæ, Aurantiaceæ, Melastomaceæ, Araceæ, and the genus Ficus, have disappeared; and in place of a variety of large trees, the Hawaiian forest is composed of only two kinds, an *Acacia* and *Metrosideros*. Normal epidendric Orchidaceæ have also disappeared: and notwithstanding the favorable climate and circumstances, the whole Tribe of *Orchidaceæ* are rare; *Compositæ* on the other hand have become abundant; another instance of these two leading Tribes of plants presenting themselves in inverse proportions.—*Malvaceæ* too, have become somewhat more abundant.—But perhaps the most striking change is in the Ferns; predominating over other tribes even more than in Southern Polynesia, but in a different set of genera and species, of different aspect; *Aspleniums* especially being abundant, and *Adiantums* extremely rare.—There is also, even in the warm District, an increased number of Northern Tribes, *Rosaceæ*, *Labiatæ*, *Vacciniums*, *Violas*, *Caryophyllaceæ*, and *Plantagos;* with a greater variety of *Mosses* and *Lichens;* attributable, doubtless, to the proximity of lofty mountains.

The following Tribes of Plants, more or less frequent throughout Southern Polynesia, have disappeared:

Dilleniaceæ,	Melastomaceæ,	the genus Ficus,
Anonaceæ,	Passifloraceæ,	the tribe Casuarineæ,
Olacaceæ,	Cunoniaceæ,	Balanophoraceæ,
Aurantiaceæ,	Jasminaceæ,	true epidendric Orchidaceæ,
Guttiferæ,	Acanthaceæ,	Scitaminaceæ,
Malpighiaceæ,	the genus Clerodendrum,	Araceæ, and
Meliaceæ,	Myristicaceæ,	the genus Flagellaria:
Combretaceæ,	(the tribe Acalypheæ),	
Rhizophoraceæ,	the genus Elatostema,	

and the three following Tribes, *Tiliaceæ*, *Cucurbitaceæ*, and the whole Family of *Orchidaceæ*, have become rare.

The above are exceptions only to a remarkable conformity with the Southern groups in the proportional frequency of the Families of plants. The PREVAILING FAMILIES were nine, occurring in the following order of frequency:

1. *Filices*, or ferns.
2. *Glumaceæ*. Including, besides the *grasses*, the *Cyperaceæ*, which have become frequent and various.
3. *Myrtaceæ*. Confined almost entirely to species of *Metrosideros*.

4. *Leguminosæ.* On account of the bulk, and the frequency as a forest-tree, of *Acacia heterophylla.*

5. *Coffeaceæ.* Consisting, as usual elsewhere, mostly of shrubs.

6. *Urticaceæ.* Consisting almost exclusively of shrubs.

7. *Lobeliaceæ.* Provided the *Scævolas* be included.

8. *Labiatæ.* From the abundance of the *Phyllostegia* Tribe.

9. *Compositæ.* Not only frequent, but in very considerable variety.

Next in order, the six following Families were the most frequent: *Malvaceæ; Pandanaceæ,* from the abundance of Freycinetia; *Euphorbiaceæ,* presenting however little besides a single type of Euphorbia; *Convolvulaceæ; Cyrtandraceæ;* and *Araliaceæ.*

Chiefly prominent among the INDEPENDENT FEATURES of the Hawaiian flora, are the *woody Lobeliaceæ;* including several well-marked genera, and a much larger number of species than has been supposed. They are mostly rank-growing plants; many of them simple-stemmed shrubs, six to twenty feet high, the terminal tuft of long narrow leaves, often imparting a Dracæna-like aspect. One species only became a tree, branching, and forty feet high. But there are species having broad and very large leaves: others with prickly leaves, especially in young plants, or even deeply and compoundly lobulated as in certain species of Solanum. The flowers too are often very large, and would be conspicuous but for their prevalent green color; yet showy species are by no means wanting, bearing ornamental spikes of large deep-blue flowers, others having the flowers white, and one species having them bright yellow. *Scævolas* are likewise abundant and various, but have the normal habit of ordinary shrubs. Another independent feature is found in certain remarkable *Violaceæ;* forest-shrubs, and hardly ornamental, but they are quite rare.—Many of the peculiarly Hawaiian features are more or less connected with the presence of mountains; as the *Dubautias,* numerous and generally diffused, most of the species shrubs, and some becoming small trees; *Broussaisia; Osteomeles,* a Rosaceous plant; and a woody-stemmed *Plantago,* becoming a tall shrub.—But there are other peculiar genera, unequivocally Tropical; as *Charpentiera; nov. gen. Rutac.; nov. gen. Palmac.;* several remarkable genera of *Araliaceæ;* as also of *Coffeaceæ* and *Ferns.*—In all, there are probably not less than fifty genera peculiar to the Hawaiian Islands: and of the indigenous species, all that grow inland seem strictly confined to these islands, and do not extend to any other portion of the Globe.

The Hawaiian Islands are the most distant point on the Globe to which AUSTRALIAN ANALOGIES extend; and some of these are very decided; as, the presence of *Exocarpus*, of a *heterophyllous Acacia*, a *Doodia*, and *Epacrideæ*.—NEW ZEALAND ANALOGIES are yet more intimate and obvious; in the presence of *Edwardsia?*, *Metrosideros*, *Morelotias*, *Myoporum*, and of an indigenous *Dracœna*. Besides other forms that occur throughout the Southern Hemisphere generally, or are almost Antarctic; as *Nertera*, *Uncinia*, and *Acœna*.

Contrary to the state of things in Southern Polynesia, there are AMERICAN ANALOGIES upon the Hawaiian Islands; one even within the Lower or warm District; the presence of *Nama*. On the mountains, American analogies are more numerous: as, the presence of *Gunnera;* of a *Pteris* resembling P. verticillata of the Peruvian Andes; of *Sisyrinchium;* a *Stevia-like* Compos.; *gen. Poa-like* having the common calyx enlarged, a red-flowered *Rubus*, and a yellow-flowered *Sanicula*, all three resembling Oregon species; besides *Phyllostegias*, provided that the Californian species prove congeneric. There are also on the mountains, various general Northern and sub-Arctic forms.

The following plants were found growing in the INFERIOR OR WARM REGION OF THE HAWAIIAN ISLANDS; between the sea and the elevation of 6700 feet on the mountains:

(Nephroica) Ferrandiana, (No. 1); Cocculus of Gaudichaud. Seeds resembling those of Menisp. Canadense; leaves ovate, acute. Tauai; and at the elevation of four thousand feet, in grassy places along the upper base of Mauna Roa.*

Lepidium Owaihense, (compare No. 1 Paumotuan to Bellinghausen and Wake's coral-islands). The leaves somewhat succulent. Tauai, Oahu, and elsewhere; submaritime.

Capparis nov. sp., (No. 2). Sometimes becoming a small tree, ten to fifteen feet high. Oahu, Southeast coast of Hawaii, and elsewhere; keeping within a mile of the sea.

Viola (No. 1). Normal, though becoming a shrub, upright, and one to two feet high; leaves ovate, cordate at base, long-pointed. On "Mauna Kaala," within the Leeward portion of Oahu, Brackenridge.

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* The number of American and Mexican weeds is very striking; some of them apparently of Aboriginal introduction; brought from the coast in ancient times by the natives themselves, by Polynesian and Hawaiian navigators.

Argemone (Mexicana; compare United States and No. 1 Brazil); white-flowered. A weed abundantly naturalized around Honolulu, and elsewhere; said to have been introduced within the memory of resident Whites.

Brassica oleracea, (bis Taheiti to Tongatabu, and No. 1 Europe); the cabbage. Abundantly naturalized, especially in elevated situations; having been introduced by trading and colonial Whites.

Gen. Violac., (No. 1). A shrub, six feet high; leaves oblong-ovate, serrulate. Growing in a ravine on the Southern flank of Mauna Kaala, at the elevation of a thousand feet; (pointed out to me by Mr. Brackenridge).

——— (No. 2). A shrub, six feet high; large obovate coriaceous leaves, six inches by two; flowers small, inconspicuous, and greenish, arising along the stem from the old wood, short pet. Growing in the same locality, on the Southern flank of Mauna Kaala; (pointed out to me by Mr. Brackenridge).

——— (No. 3); habit of the last, but the leaves smaller, subsessile, with few crenatures. Growing in the same locality, on the Southern flank of Mauna Kaala; (pointed out to me by Mr. Brackenridge).

Nov. gen. Silenoid, (No. 1). Long, trailing, broad-leaved; a terminal corymbose panicle; the flowers Stellaria-like. Tauai, Oahu, and from the elevation of one thousand feet to that of five thousand in the forest on Mauna Kea.

——— (No. 2). A foot high; the stem shrubby at base; dichotomous upright branches; leaves lanceolate, small, broader than in (No. 5), to be mentioned presently. Tauai; and frequent on the intervening plain on Oahu, North of the Mauna Kaala ridge.

Paritium tiliaceum, (bis No. 1 Metia to the Feejee Islands, and compare Brazil); the "hau." Properly submaritime, but owing to some unexplained local peculiarity, the thickets of this plant commence only at a distance from the sea-shore, in the ravines at the base of the mountains. On the gradual slope between Hilo and the Great Crater extending to the elevation of a thousand feet above the sea.

Hibiscus Youngianus, Gaud.? (No. 3); leaves somewhat scabrous; flowers rose-colored. Frequent in marshy ground, on Oahu; as also on Hawaii, between Hilo and the Great Crater, the leaves sometimes deeply lobed.

——— nov. sp., (No. 4). Highly ornamental; leaves deeply lobed, and resembling those of Vitis and of certain species of maple; flowers yellow. Clinging to the face of lofty precipices in the mountain-defile across West Maui.

Gen. Hibiscoid, (No. 1). A small tree, fifteen to twenty feet high; leaves broad-ovate, obtuse, nearly entire; calyx very small, cylindrical, with about six small, linear, deciduous appendages; flowers large, white with a pink centre; a projecting column of long stamens; fruit also small. On the mountains behind Honolulu; and on the Mauna Kaala ridge.

Gossypium nov. sp., (No. 2). A shrub; 5-lobed, velutinous leaves; and very short brown or nankin-colored wool. On the arid Leeward portion of Oahu, and of West Maui; (harmonizing with the vegetable growth around, and) clearly indigenous.

Senebiera (didyma). Abundantly naturalized in waste places; in company with other weeds, taking temporary possession of the Desert environs of Honolulu, and springing up after the slight winter rains, like an indigenous growth of annual plants. Introduced, (probably from the Western coast of America).

Cleome spinosa, Lin. Prickly and five-leaved; the flowers pale-purple. Abundantly naturalized; introduced, probably from Tropical America, and by colonial Whites.

Thespesia populnea, (bis No. 1 Samoa to the Feejee Islands; see also Tarawan coral-islands). Planted around the dwellings of the natives, in the village of Kaimo and elsewhere; also in the gardens of residents, having been introduced by aboriginal settlers.

(Gossypium, bis No. 1 Metia to the Feejee Islands. Naturalized.)

Gen. Malvac., (No. 2; a congener of No. 1 Peru?, and) compare Brazilian genus. Abutilon-like, with small rose-colored flowers; a delicate plant, having velutinous cordate leaves; calyx without appendages; carpels five, elongate. On the barren Leeward side of Oahu, growing near the Salt Lake.

Sida (No. 6; compare No. 1 Phœnix, Tarawan, and Wake's coral-islands); smooth; leaves broad-ovate, serrate, green on both sides. Frequent on the barren Leeward portion of Oahu. The natives cultivate the variety with numerous petals, for decorating the hair; being the only indigenous plant I can recollect seeing under cultivation.

——— (No. 7); leaves ovate, velutinous on both sides; corolla somewhat rotate, from the inequal or unilateral, truncate apex of the petals. Found by Mr. Brackenridge "near the coast of Hawaii, to the South of Lua-Peli" or the Great Crater.—Apparently the same broad-leaved species observed on Oahu, and elsewhere.

——— nov. sp., (No. 8); leaves broad-cordate, plicate, woolly. In arid situations, on Oahu, and elsewhere; frequent.

Gen. Sida-like, (No. 1; compare Malva Americana of Cav.). The calyx seeming calyculate, or having narrow appendages; leaves much like those of Sida spinosa, penni-nerved, hairy; carpels about twelve, mutic. On the Leeward portion of Oahu.

Waltheria; compare (No. 1) Feejee Islands; very woolly. Frequent in open situations; on the route from Hilo to the Great Crater, and elsewhere, as far as the elevation of 2500 feet. Observed also, on the Southeast portion of Hawaii.

Gen. Grewioid, (No. 1). An unsightly shrub, one to three feet high; having the habit of Tiliaceæ and Grewia. In the sands of the low isthmus on Maui.

Eurya? (No. 3); a congener of the Samoan sp. A shrub, fifteen feet high; leaves cordate at base. On the mountains behind Honolulu, the leaves sessile; and growing also at the elevation of two thousand feet in the forest on Mauna Kea.

——— (No. 4); seeming distinct; the leaves smaller, short-petioled. On the mountain-ridge behind Honolulu, at the elevation of two thousand feet.

Gen. incert. with Calophyllum-like fruit, (No. 1). A shrub; leaves scattered, serrate; five deciduous sepals, and as many petals; twenty stamens; style single, and one carpel, the fruit being Calophyllum-like but smaller. Frequent on the mountains behind Honolulu.

Dodonæa (compare Brazil, Peru, and No. 1 Metia to the Feejee Islands); leaves covered

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——— herbaceum, (No. 3); the variety cultivated in the United States. Introduced by colonial Whites.

Bixa Orellana, (bis No. 1 Brazil and Peru); the arnotto. Cultivated on Oahu; having been introduced by colonial Whites.

Citrus aurantium, (bis Taheiti to the Feejee Islands); the orange. Succeeds only in a few sheltered situations near Hilo, and especially on the North side of Tauai; where there are several trees, said to have been "planted by Vancouver."

——— (limonum, bis Taheiti to Tongatabu); the lime. The fruit offered for sale at Honolulu, but the tree was not seen. Introduced by colonial Whites.

Cardiospermum helicacabum, (No. 1, bis Metia to the Feejee Islands). A frequent weed, as at Taheiti; having been introduced, probably by aboriginal settlers.

Melia azederach, (bis Taheiti). Planted in gardens; said to have been introduced "by the Vincennes on a former cruise."

with furfuraceous scales, and in many instances not viscous; fruit greatly varying. From the sea-coast to the elevation of 6500 feet on Mauna Roa, and eight thousand feet on Mauna Haleakala. Growing also, on the mountains behind Honolulu.

(Perrottetia Sandwicensis of Gray, No. 1). Gen. Cissus-like, but a regular upright shrub; 5-fid calyx, and apparently a corolla; fruit small, of four cells, each containing one rough seed. Frequent on the mountains behind Honolulu.

Gen. incert. (No. 1). A tree; leaves pinnate, bijugis, the leaflets entire; panicles, the fr. like a single pod of the four-fruited gen. (Rutac.), and containing one large shining seed. Tauai.

Gen. Rutac.? black-dotted, (No. 1). Woody; leaves narrow-obovate, black-dotted as in Myrtaceæ; sepals four, in the bud or æstivation an outer pair enclosing an inner pair. On the tabular summit of Tauai, about four thousand feet in elevation.

Nov. gen. Rutac., (Pelea of Gray, No. 1). A tree, twenty-five feet high; leaves verticillate in fours, obovate, obtuse, the midrib beneath dark; fruit small, the carpels 2-seeded. On the mountains behind Honolulu; also, in the district of Puna on Hawaii, and in the forest on the North flank of Mauna Kea.

———, (No. 2); a second species. Eighteen feet high; leaves opposite, the under surface somewhat shining, the midrib beneath white, the petioles persistent, having a tendency to become woody; fruit larger, and slightly carinate. "Between Pahuhali and Puna, at the elevation of eight hundred to a thousand feet," Brackenridge.

———, (No. 3); a third species. A spreading tree, forty feet high with the trunk two feet in diameter; petioles and young twigs woolly; leaves and fruit large. In the forest on the North flank of Mauna Kea, growing at the elevation of from 4000 to 5500 feet.

———, (No. 4); a fourth species. An upright and nearly simple-stemmed shrub; leaves verticillate in threes, elongate, sessile, auriculate at base, the midrib whitish beneath; fruit rather small, subsessile along the old wood below the leaves. In the forest on the North flank of Mauna Kea, growing at the elevation of about 3000 feet.

———, (No. 5); a fifth species. "A tree, twenty feet high, with the trunk eight or ten inches in diameter;" leaves opposite, narrow, obovate, short-petioled, twelve inches by three; fruit solitary, axillary. "Forest on the North flank of Mauna Kea, at the elevation of 2000 feet," Brackenridge.

———, (No. 6); possibly distinct. An arborescent shrub; leaves opposite, small, geniculate on the petiole. On the mountains behind Honolulu, frequent.

——— ?, (No. 7); leaves opposite, oblong, entire, the under surface velutinous; flowers in short axillary racemes; sepals four. Along the Southern base of Mauna Kaala.

——— ?, (No. 8;) perhaps not distinct from the last; long hairs on the under surface of the leaves. Tauai.

Oxalis Dieppe. Flowers rose-colored. A weed in sugar plantations around Hilo; introduced, probably from the Mexican coast, by colonial Whites.

Inocarpus edulis, (bis No. 1 Taheiti to the Feejee Islands). "In Mr. G. Wood's garden; having been brought from Taheiti" by colonial Whites, Brackenridge.

Spondias dulcis, (bis No. 1 Taheiti to the Feejee Islands); the vi-plum. "In Mr. G. Wood's garden; having been brought from Taheiti" by colonial Whites, Brackenridge.

Mangifera Indica, (bis Brazil); the mango. In a garden at Hilo; introduced by colonial Whites.

Tribulus cistoides, (No. 1). In the Desert environs of Honolulu, and in some other Desert-like spots; in the middle of November, covering the ground with flowers like Ranunculus.

Pittosporum (No. 5); under surface of the leaves woolly. Mauna Roa, to the elevation of 6500 feet.—The same species perhaps, growing at the elevation of a thousand feet on the lava-covered Southeast portion of Hawaii.

——— (No. 6); perhaps distinct from the last; the leaves smooth, obovate; fr. corrugate. On the mountain-ridge behind Honolulu on Oahu.—Apparently the same species, found by Mr. Brackenridge "near the sea-coast South of Lua-Peli," having the fruit smoother, the seeds rough.

——— (No. 7). Twenty feet high, with the trunk a foot in diameter; flowers odorous, corymbose, and rather ornamental. On the North flank of Mauna Haleakala on Maui, to the elevation of 6700 feet.

——— (No. 8); leaves smooth, lanceolate, pointed; cymes pedunc., below axils; capsule 2-valved. On the mountains behind Honolulu.

———? (No. 9); leaves narrow, smooth, upright at the end of the branches; no flowers. On the mountain-ridge behind Honolulu, at the elevation of two thousand feet.

———? (No. 10); leaves obovate, obtuse, attenuate; fruit small, terminal, compressed, 2-valved. On the Mauna Kaala ridge.

Gen. Pittosporoid? (No. 1). A tree, forty feet high; leaves very large, pointed, the under surface arachnoideo-tomentose; no flowers. On the "North flank of Mauna Kaala," Rich and Brackenridge.

Gen. Chrysophylloid, (No. 1). A tree, "thirty to forty feet high;" leaves alternate, entire, smooth, long-petioled; no flowers. On the "North flank of Mauna Kaala," Rich and Brackenridge.

———, (No. 2); a second species. Smoother, and the petioles longer; fruit of the size of a small apple, and apparently two large seeds; five short rounded sepals at base. On the Mauna Kaala ridge.

———?; compare the preceding. The leaves alternate, smooth, reticulate, coriaceous, petioled; five sepals; apparently more than one stigma, the pomum? of one cell, containing two seeds. Tauai.

Nov. gen. hexandra, (No. 1); Ilex of Hooker. Usually a shrub, but at the upper margin of the forest on Mauna Kea becoming a tree, forty feet high, with the trunk two feet

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Indigofera (compare Taheiti to Samoa, and No. 25 Peru); a shrub. Abundantly naturalized around Honolulu, Hilo, and elsewhere; said to have been introduced within the memory of resident Whites.

Tephrosia piscatoria, (No. 1, bis Metia to the Feejee Islands). Abundantly naturalized in the open ground; having been introduced by aboriginal settlers. In former times, sprigs were "placed in crevices of the coral-bottom to attract the fish."

Desmodium (No. 6); a low white-flowered species. Naturalized around Honolulu; and found on Hawaii by Mr. Rich; said to have been "brought from America."

Agati grandiflora, (No. 2). The usual large-flowered kind cultivated in gardens, having been introduced from abroad by colonial Whites.

Edwardsia (No. 1). A single mamani tree, "planted by the birdcatchers" at the fork of

in diameter; the young leaves sometimes serrate; cal. generally 6-fid; stigmas in a linear series on the summit of the young fruit. Oahu; also at Hilo, and in the environs of the Great Crater, and elsewhere; frequent.

———; possibly distinct; the leaves narrower, with the petioles longer. On the mountains on Oahu.

Gen. incert. with 4-fid calyx, (No. 1); habit of Laurus, but the stamens and petals four. A tree, "twenty-five to thirty feet high;" leaves alternate or sometimes sub-opposite, oblong, acute at each end; style single; drupe of the size of a cherry, blue, containing a hard nut. On the "North flank of Mauna Kaala," Rich and Brackenridge; observed also on South flank.

Gouanioid (No. 1). A rambling shrub, with tendril-like woody branches; leaves cordate, penninerved, serrate; fruit trialate when ripe, trivalved, crowned with the 5-fid calyx. On the Southern flank of Mauna Kaala.

(Gouania ?, No. 2); Rhamnoid, but apparently polygamous. Sub-herbaceous, upright and simple, a foot high; minute petals; fruit trigonal, Croton-like, but crowned with the calyx. In the submaritime sands of Tauai, and of the low isthmus on Maui.

(———); possibly distinct; the leaves smaller and smoother; fruit trigonal, crowned with the calyx. In dry woodland, on the Southern flank of Mauna Kaala.

Gen. incert. (No. 1); Cassuvioid in habit. A spreading tree, forty feet high, with the trunk two and a half feet in diameter; leaves alternate, entire, reticulate, pointed, petioled, the upper surface shining; the drupe has rudiment or spur at base, as in Sapind. ?, and contains one large seed, without shell. On the Southern flank of the Mauna Kaala ridge.

Rhus nov. sp., (No. 4). A shrub, four to ten feet high; habit of R. glabra; leaves Juglans-like and deciduous, but first turning yellow and becoming conspicuous in the distance. On Oahu; and frequent on North side of Hawaii.

Agati (No. 1). Trailing, for fifteen to twenty feet, but sometimes becoming a small tree; flowers not half the size of the cultivated variety, on some stocks yellow, on others orange-colored or even altogether scarlet. On the sea-coast "South of the Great Crater," Brackenridge; and along the Southern base of Mauna Kaala.

Dolichos (bis No. 1 Taheiti to the Feejee Islands). Maritime; frequent along the sea-shore.

———? nov. sp., (No. 2); leaves reticulate on both sides, the leaflets linear; flowers yellow, and rather large; the root said to be edible. On Tauai; also on the Leeward side of West Maui; and at the elevation of four thousand feet between the Great Crater and the upper base of Mauna Roa.

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a path in the middle of the forest on Mauna Kea, "to attract the birds by the different aspect of the foliage." The tree had not produced flowers; as it does in its indigenous state in the pastoral region above.

Phaseolus amœnus; bis (No. 1 Taheiti to the Feejee Islands, and compare No. 11 Peru). Frequent on Oahu; (having been introduced by aboriginal settlers).

Lablab (vulgaris; No. 1), bis Feejee Islands. Flowers in long spikes, white; leaflets deltoid, and having stipels or lesser stipules. Naturalized along the river-bank at Hanalei in Tauai, also on Oahu, and elsewhere; having been introduced by aboriginal settlers. —The ornamental purple-flowered variety seen at Koloa on Tauai, had been introduced by colonial Whites.

Mucuna (compare No. 1 Taheiti to Tongatabu); under surface of the dried leaflets whitish and sericeous; pods swelling, hispid, with several oblique alæ. "Northern base of Mauna Kea," Brackenridge.

——— (No. 4); leaves smooth, the under surface green; hairs on the calyx; flowers in a dense cluster, green; pod smooth and devoid of oblique alæ. Seen only at the spring or natural reservoir, at the elevation of about fifteen hundred feet back of Kaimo on Hawaii.

(Gen. Mucunoid); bis (No. 1) Feejee Islands. Leaflets ovate, roundish, smooth on both sides, with stipels at base of petioles; scarlet Erythrinoid flowers. Growing in wild situations in woods, on Oahu, and also near Hilo.

Kennedyoid (No. 3); compare Canavalia? second sp. A vine, leaves thin, penninerved; flowers purple, with a long carina. On the Mauna Kaala ridge, and elsewhere.

Canavalia (compare No. 1 Samoa to the Feejee Islands), but the pod seeming larger; leaves penninerved. Tauai; and along the Northern coast of Hawaii.

Erythrina monosperma, Hook. (No. 3); a remarkable species; well-named, but the pod sometimes having two seeds. A small tree. Growing on the Southern flank of the Mauna Kaala ridge, and along the Southeast coast of Hawaii.

Guilandina; bis (No. 1 Samoa to the) Feejee Islands. Frequent along the sea-coast.

——— nov. sp., (No. 3); flowers yellow; seeds dark brown. Growing in the Interior, and not seen within a mile of the sea; somewhat rare.

Acacia heterophylla, (No. 3); the "koe." One of the two principal forest-trees of the Hawaiian Islands; seen ninety feet high with the trunk five feet in diameter, and stocks of larger growth were spoken of. Intermediate in character between the pinnate-leaved and the phyllodia-bearing species; phyllodia being present in every stage of development, or more or less free from pinnæ of leaflets.

Osteomeles anthyllidifolia, (No. 1); near Sorbus. A straggling clustered shrub, four to eight feet high; the fruit white, sweet, and astringent. Frequent throughout the Group, from the elevation of 1000 to 4500 feet on Mauna Roa, and to 6500 feet on Mauna Haleakala.

Rubus (No. 2); flowers red, large, resembling those of R. odoratus. Usually a shrub; but in the deep forest on Mauna Kea, arborescent, thirty feet high, with a smooth trunk five inches in diameter. Occurring abundantly as a shrub on Tauai, Mauna Haleakala, around the Great Crater, and elsewhere; on the Windward flank of Mauna Kea, extending from the elevation of 1500 to 7500 feet.

Lythrum (No. 1; compare Chili and Peru); flowers purple, and rather small. Abounding between Hilo and the Great Crater; and in moist places, very generally diffused throughout the Group.

Gen. Myrtac. (No. 1). A tree "twenty feet high;" leaves long-obovate; axillary,

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Cajanus Indicus, (No. 1). Introduced by colonial Whites; and now often cultivated by the natives.

Poinciana pulcherrima, (bis Taheiti to Tongatabu); always remaining a shrub. Seen only in the gardens of colonial Whites.

Cassia Occidentalis, (No. 3, bis Taheiti to Tongatabu). Naturalized in waste places; and growing in wild situations on the lava-covered Southeast portion of Hawaii.

(——— scandens. Introduced, and cultivated for ornament, by colonial Whites.)

peduncled, few-flowered racemes; berry as large as a cherry, crowned with the fleshy calyx, and containing two or three large seeds. "On the mountains behind Honolulu," Brackenridge.

(Gen. Myrtoid, No. 2); perhaps a congener of lax-growing Feejeean sp. "A lax-growing undershrub;" thin broad leaves, no flowers. "On the mountains behind Honolulu," Brackenridge.—Apparently the same species at the elevation of 2000 feet on these mountains, a shrub, the leaves obovate, and axillary peduncled cymes.

Metrosideros (No. 4); very woolly, and turning yellowish in drying; leaves very broad, cordate at base. Seeming almost peculiar to the lava-covered Mauna Roa and country around the Great Crater; growing at the elevation of from 1200 to 7500 feet.

———; perhaps only a variety of the last; growing intermingled, entirely smooth, and the leaves cordate at base.

——— (No. 5); compare the first sp. Under surface of the leaves woolly; and very large flowers. "Summit of the mountain-ridge behind Honolulu, on the West side of the gap," Brackenridge.

——— (No. 6); leaves narrow at base, elliptical, smooth; fruit larger and "more free" than in the first sp. "South of the Great Crater," Brackenridge.

——— nov. sp., (No. 7); the "ohia;" the leaves smooth, elliptical, but somewhat attenuate at base; flowers incanous and woolly. A large tree, somewhat resembling an oak; two kinds were pointed out by resident Whites, as "differing in the leaves and quality of the wood," but I could perceive no specific distinction. In company with Acacia heterophylla, constituting the forest on the Windward flank of Mauna Kea.—Apparently the same species, growing on Tauai.

——— nov. sp., (No. 8); small Buxus-like leaves; flowers small, woolly. "On the mountains behind Honolulu, near Mr. Rooke's residence," Brackenridge.

——— nov. sp., (No. 9); smooth large leaves, long petioles; fruit large and smooth. "On the mountains West of the gap behind Honolulu," Brackenridge.

———; leaves small, broad, penninerved but rugose, the under surface woolly and ferruginous. Mountains behind Honolulu, at the elevation of 2000 feet.

——— nov. sp., (No. 10). A lax-growing shrub, with smooth lanceolate leaves. On the mountains behind Honolulu.

(Sicyocarya, No. 1); Sicyos of Hooker. Leaves often deeply lobed, the lobes about five, acute. On the Mauna Kaala ridge; also near the upper margin of the forest on Mauna Kea, at the elevation of six thousand feet.

Nov. gen. Cucurb., (No. 1). Fruit clustered in threes, externally Cucumis-like, but the

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Amygdalus Persica, (bis United States, Rio Janeiro, Chili, and No. 1 Northern Asia); the peach. According to Rev. Mr. Baldwin, "the fruit has not been known to ripen; and the tree, planted at Karakakoa Bay, becomes evergreen, and will not flower unless artificially stripped of its leaves." Seen under cultivation at Hilo, and elsewhere.

Jussiæa angustifolia? (compare, according to the account by Gray, No. 14 Peru). Oahu, Hilo, and elsewhere, growing in taro ponds and marshy ground; seeming at home, but perhaps introduced.

Psidium (bis Taheiti, and No. 4 Brazil and Peru); the guava. Hardly succeeding beyond the District of Hilo, on the North coast of Hawaii. Introduced by colonial Whites.

interior tough and fibrous; leaves with a deep sinus, cordate, acuminate, denticulate; flowers small. In the forest on Mauna Kea, growing at the elevation of from four thousand to six thousand feet.

Talinum? (No. 1). Many-crowned; stems tortuous, a foot or more in length; leaves spatulate, three inches long; racemes of flowers below the leaves; sepals five; capsule of one cell, and seeming devoid of regular valves, the placenta central. On the coast cliffs along the Northern base of Mauna Kea; but discordant amid the surrounding vegetable growth, as though out of place, almost reminding one of Madeira.

Portulaca; bis (No. 2 Gardner's and other Phœnix coral-islands). Fleshy upright stem; yellow flowers. On the arid Leeward portion of Oahu, clearly indigenous.

——— (No. 6; compare Brazil, and) P. pilosa. Flowers deep purple, and rather ornamental. On the arid Leeward portion of Oahu, and of other islands in the Group.

——— nov. sp.; seeming distinct from the last; the flowers pale or whitish. On the sands of the low isthmus on Maui.

Sesuvium; bis (No. 1) Tongatabu (to Phœnix) and Wake's coral-islands; flowers purple. Oahu, and elsewhere; frequent along the sea-shore.

Broussaisia arguta, (No. 1); a Hydrangea-like shrub. Frequent in woodland districts; Oahu, Puna on Hawaii, and elsewhere.

(Reynoldsia, No. 2); Araliac., a congener of Samoan sp. A tree, thirty feet high; leaves pinnate, the leaflets subcordate, with some dentures at base; capsule of eight cells. Along the Southern base of Mauna Kaala; and seen by Mr. Brackenridge "on the coast of Hawaii South of the Great Crater."

———; seeming distinct, but the leaves and flowers young. A small tree, twenty feet high; leaves pinnate, bijugis, the leaflets as yet only half an inch to an inch long; flowers small. On the Southern flank of Mauna Kaala.

Nov. gen. platyphyllum, (No. 1); Panax of Hooker. A shrub, fifteen feet high; leaves poplar-like or Styllingia-like, but ternate. On the mountain-ridge behind Honolulu, at the elevation of 2000 feet.

——— ovatum, (No. 2); Panax of Hooker. A shrub, twelve feet high; leaves ternate, the leaflets ovate, entire, long-petioled; five stigmas, and as many seeds. On the mountains behind Honolulu, at the elevation of 2000 feet.

Nov. gen. trigyna, (No. 1); Aralia of Gaudichaud. A tree, forty to fifty feet high, with the trunk two feet in diameter; the leaflets crenate. In the forest on Mauna Kea, growing at the elevation of from 4000 to 6700 feet.

———; perhaps the same species. Young; leaves quinate, the leaflets entire, acute. In woods on the route from Hilo to the Great Crater, C. P.

Jambosa Malaccensis, (No. 1, bis Taheiti to the Feejee Islands); flowers red. A frequent tree, introduced by aboriginal settlers.

Lagenaria vulgaris, (No. 1, bis Taheiti to Tongatabu); the gourd. A giant-fruited variety, which I have seen only at the Hawaiian Islands; where the excavated shells are used as a substitute for baskets, barrels, trunks, and boxes. Introduced by aboriginal settlers.

Sicyos angulata, (bis United States, New Zealand, and Australia). Naturalized at Lahaina, and elsewhere; introduced, probably by colonial Whites.

Nov. gen. Aral., (Tetraplasandra of Gray, No. 1). A fine tree, thirty feet high with the trunk a foot in diameter; leaves impari-pinnate, trijugis, the leaflets very large, entire, white-tomentose beneath; umbels decompound, covered with close tomentum; stamens thirty to forty. Pahuhali; observed also by Mr. Brackenridge, perhaps higher up "in the Puna District."

——— (No. 2); leaves pinnate, the leaflets entire, fleshy. On the mountain-ridge behind Honolulu, at the elevation of 2000 feet.

Arceuthobium (No. 4); stems very much compressed. Upper margin of the forest on Mauna Kea, at the elevation of 6700 feet; and in other mountainous localities.

——— (No. 5); possibly not distinct from the last, but the stems entirely cylindrical, not dilated. Southern flank of Mauna Kaala; also, on the mountains behind Honolulu; and in other mountainous localities.—The only Loranthaceous plants met with.

Psychotria ? (No. 4); leaves obovate, penninerved; peduncled thyrsus. Puna on Hawaii, and in other localities; frequent.

——— (No. 5). Arborescent, twenty feet high, with the trunk five inches in diameter; leaves smooth, obovate, petioled, distant at base; terminal long-peduncled cymes; corolla 5-fid, the tube short. North coast of Hawaii near Hilo, growing at the elevation of only fifty feet above the sea.

Ixoroid (No. 1). A "shrub, eight feet high;" the young branches pubescent, but the leaves smooth; inflorescence terminal; corolla 4-fid, greenish, the tube slender. "Woods in the Puna District" on Hawaii, Brackenridge.

——— No. 2; a second species. A shrub, eight to ten feet high; thyrsi arising below the leaves and along the stem from the old wood; calyx 4-fid. Forest on the North flank of Mauna Kea.

——— ; compare the last sp., and also Psychotr.; leaves smaller, penninerved. A tree, forty feet high with the trunk two feet in diameter; inflorescence lateral and terminal; fruit apparently two seeded. Forest on the Windward flank of Mauna Kea.

——— ; compare prior sp. A shrub, six to eight feet high; slender greenish inconspicuous flowers. In the mountain-defile across West Maui.

———? nov. sp., (No. 3). Upper surface of the leaves shining, as if glutinous; fruit clustered, small, containing two seeds. On the mountains behind Honolulu.

(Myonima ?, No. 2). A "stunted tree, ten feet high;" hairy; intermediate stipule deciduous; fruit solitary, peduncled, 4-angled, crowned with contracted calyx having obsolete teeth; apparently four seeds ?. Tauai.

Gen. (Garden. ?, No. 1); the "nau." Leaves pilosiuscul., large, long, attenuate, each pair of petioles uniting in a common sheath at base; fruit 4-angled, containing numerous small seeds. Growing on the "mountains behind Honolulu," the specimen

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Citrullus (bis Samoa to Tongatabu, the United States, and No. 1 Tropical Africa). The water-melon. Introduced by colonial Whites.

Carica papaya, (bis Metia to the Feejee Islands, and No. 1 Tropical America). Cultivated.

Portulaca oleracea, (bis United States, Taheiti and Tongatabu). Abundantly naturalized; in the Desert environs of Honolulu, springing up with the Senebiera and other weeds after the slight winter rains. Introduced by colonial Whites.

Opuntia; compare O. Dillenii. Naturalized in the arid Leeward portion of Oahu, espe-

brought by a native to Mr. Rogers; "used as a dye by the natives, and the wood said to be equal in quality to box-wood."

Gen. (Cornus-like, No. 2); Coffeac?. Intermediate stipule deciduous; leaves lanceolate, petioled, verticillate in threes; berries in peduncled capit., crowned with calyx having about five teeth; apparently two seeds. On the mountain-ridge behind Honolulu, at the elevation of two thousand feet.

Gen. Hedyotoid, (No. 1). Hedyotis-like, but a shrub, one to three feet high; leaves oblong; corolla long tubular. "South of the Great Crater, on the lava-plain and near the sea," Brackenridge.—Apparently the same species, on Mauna Kaala.

———? (No. 2). A tree, twenty feet high, dichotomous branches; upper surface of the leaves shining, the under surface dull; no flowers. "North flank of Mauna Kaala," Rich and Brackenridge.

——— (No. 3). A large shrub; leaves obovate; terminal many-flowered thyrsi; calyx and corolla 4-fid, the corolla tubular, small, and inconspicuous; two seeds. On the mountains behind Honolulu.

Kadua (No. 1). Somewhat Gentian-like; trailing; leaves broad-ovate, sessile, acute. Frequent in the environs of the Great Crater.

——— (No. 2); a second species. Small greenish flowers, turning blue in drying. In the mountain-defile across West Maui.

———; perhaps not distinct; trailing. On the mountains behind Honolulu.

——— (No. 3); a third species, the finest, and the flowers largest. Herbaceous; one to two feet high; leaves long-lanceolate, abrupt at base. On the mountain-ridge behind Honolulu, at the elevation of 2000 feet.

——— (No. 4); a fourth species. Root perennial; stem herbaceous, six to eight inches high; leaves narrow, lanceolate; flowers small. On the mountains on Oahu.

——— (No. 5); a fifth species. Sub-herbaceous, one to two feet high; leaves small; flowers few, and rather large. On the South flank of Mauna Kaala.

——— (No. 6); near the last, but a terminal corymb of numerous flowers; the under surface of the leaves glaucous. Tauai.

——— (No. 7); leaves ovate, short-petioled; a large panicle, with broad floral leaves. On the mountains behind Honolulu.

Gen. Kaduoid, (No. 1). A rigid shrub, six feet high; axillary long tubular green flowers, which are 4-fid. On the mountains behind Honolulu; and in the mountain-defile across West Maui.

Gen. Burchellioid, (No. 1). A shrub, two to four feet high; the flowers yellow, and rather ornamental. Woods on the route from Hilo to the Great Crater, at the elevation of about three thousand feet, C. P.

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cially in the neighborhood of the Salt Lake; regarded as established here before Whites settled on the island.

Hydrocotyle interrupta. Flowers in an irregular string of imperfect capitul. On the mountain-slope behind Honolulu; (regarded by Mr. Brackenridge, as introduced).

———; possibly distinct; capitul. of fr. single, or on separate peduncles. Found by Mr. Rich "on Hawaii," probably on the West side of Mauna Roa.

Foeniculum (vulgare; bis Chili, and No. 1 Italy). Naturalized at Waianai, on the Leeward side of Mauna Kaala; introduced by colonial Whites.

Nov. gen. Coffeac., heptandrous, (No. 1). "A shrub, twelve to fifteen feet high;" leaves broad-lanceolate, petioled; stamens usually seven, and the corolla with seven divisions. "Puna" on Hawaii, Brackenridge.

(Oxyanthoid, No. 1); gen. Coffeac. Habit of Cyrtandra; "eight feet high;" large calyx; flowers arising from the stem between the leaves. "Puna" on Hawaii, Brackenridge.

(——— No. 2); Coffeac.? Leaves ovate, pointed; stipule deciduous; berry crowned with four foliaceous rounded calyx-lobes; panic. axillary, few flowered. On the Mauna Kaala ridge.

Gen. Coffeac., two-seeded, (No. 1). Leaves narrow-obovate, subsessile; terminal cymes; fruit rather large, attenuate at base. On the mountains behind Honolulu.—Apparently the same species, on the Southern flank of Mauna Kaala.

Gen. Coffeac.? with small coriaceous leaves, (No. 1). Woody; leaves small, narrow-elliptical; small axillary peduncled cymes; calyx apparently 5-fid. On the Southern flank of Mauna Kaala.

(Erithalis?, No. 2). Woody; leaves obovate, attenuate; the intermediate stipule deciduous, leaving a line across the stem; few-flowered axillary cymes, the middle one sessile; berry of nine cells, each containing a single seed. On the mountains behind Honolulu.

Gen. Coffeac. with sheathing stipules, (No. 1). Woody; the stipules forming a persistent sheath; leaves obovate, attenuate, with short hairs; racemes clustered, peduncled; calyx deciduous, leaving a cicatrix; berry containing two seeds. Tauai.

(Guettarda?, No. 2). Twigs whitish; leaves oblong, smooth; peduncled clustered racemes; berry crowned with persistent 5–9-fid calyx; and containing two seeds. Tauai.

Gen. Coffeac.? (dicœcious?, No. 2); a congener of Feejeean sp.. Smooth Buxus-like leaves; orange-colored fruit; two long stigmas. In the environs of the Great Crater and on Mauna Roa, from the elevation of 3500 to 6500 feet; on Mauna Haleakala, from the elevation of 5500 to 9000 feet.

——— (No. 3); like the last, but the fruit beaked; leaves longer and more pointed. Growing in the environs of the Great Crater.—Compare the species observed on Tauai.

——— (No. 4). Twenty feet high, with the trunk nine inches in diameter; pubescent; fruit orange-colored. In the environs of the Great Crater and in the forest on Mauna Kea, or from the elevation of 4000 to 6700 feet.

Dubautia (No. 1). A branching shrub, six to eight feet high; leaves opposite, lanceolate, two inches long. Frequent at the elevation of 6700 feet, on Mauna Haleakala.—Apparently the same species, on the mountains on Oahu.

Morinda citrifolia, (bis No. 1 Paumotuan coral-islands to the Feejeean Group). Frequent; regularly cultivated on Tauai; introduced by aboriginal settlers.

(Geophila reniformis; No. 1, bis Taheiti to the Feejee Islands. Naturalized.)

Gardenia florida, (No. 2). Koloa on Tauai; introduced, and cultivated for ornament by resident Whites.

Coffea Arabica, (bis Brazil, Taheiti, and No. 1 Equatorial Africa). Cultivated to some extent in the mountain-valleys on Oahu; also near Hilo, and elsewhere; introduced by colonial Whites.

(Manettia?; recorded as) Manuleoid. A long woody vine; flowers 4-fid, minute. In Rev. Mr. Bishop's garden, at Ewa on Oahu; introduced by colonial Whites.

——— plantaginea, Gaud.? (No. 2); leaves strikingly resembling those of the shrub Plantago, attenuate; flowers smaller than in the other species. On the mountains on Oahu.

——— No. (3); more hairy; leaves serrate; flowers larger, corymbose. On the mountains behind Honolulu, at the elevation of fifteen hundred feet.

———; perhaps the same with the last, but the leaves very broad. On the mountains behind Honolulu.

——— nov. sp., (No. 4). Leaves long, lanceolate, attenuate, acutely serrate; terminal naked panicle. Tauai.

Mikania? (No. 1). A rambling shrub; leaves oblong, entire, smooth, reticulate; involucre about 5-leaved, uniserial. Tauai.

Cænotus? nov. sp., (No. 1). A branching low shrub, not more than one to two feet high; inflorescence corymbose. In the sands of the alluvial isthmus on Maui; also on Tauai, with the leaves small, oblanceolate and entire.—Perhaps the same species, with dentate leaves, in arid situations on Oahu.

———? (No. 2); a second species. Same habit; fewer and larger flowers, having distinct rays. Mauna Haleakala on Maui, growing at the elevation of from 1000 to 3000 feet.

———? (No. 3); a third species. A tall shrub; leaves more linear than in the coast species. Mauna Haleakala, at the elevation of 6700 feet.

———? (No. 4); a fourth species. Near C. Canadensis; leaves with a tridentate apex. "Dry rocks near Waialua" at the West end of Oahu, Rich and Brackenridge.

Gnaphalium (No. 1); root woody; leaves spatulate, white-tomentose. Sands of the low isthmus on Maui.

Gen. near Bidens, (No. 1); but no awns on aken.; compare "California tea-plant." Leaves opposite, multifid, almost Achillea-like, the segments being minute, obovate, and very numerous; involucral leaves few, apparently in two series; flowers small, the rays whitish. In a ravine near the sea-coast of Tauai.

(Lipochæta?, No. 1); Wedelia; the "tea-plant." Leaves ovate, truncate at base, long-petioled, acuminate. "South of the Great Crater, growing on rocks near the coast, at the elevation of about five hundred feet," Brackenridge.—Perhaps the same species "at the Falls" near Hilo, the leaves cuneate and attenuate at base, and coarsely-dentate.

——— nov. sp., (No. 2); leaves lanceolate, obtuse, nearly entire. Clinging to the face of rocky precipices in the mountain-defile across West Maui.

——— (No. 3); leaves subsessile, hastately trilobed at base, rough, serrate, long-pointed. "Waialua" at the West end of Oahu, Rich and Brackenridge.

———? (No. 4); leaves argutely-dentate, long-pointed; involucral scales long, leafy. In the mountain-defile across West Maui.—Compare sp. on Oahu, having obtuse crenate leaves.

Ageratum (conyzoides; bis Madeira, Taheiti to the Feejee Islands, and No. 1 Brazil). Abundantly naturalized; filling the uninhabited country on the route from Hilo to the Great Crater. Introduced by aboriginal settlers.

(Adenostemma viscosum; No. 1, bis Taheiti to the Feejee Islands.) Abundantly naturalized; frequent in wild situations on the outskirts of the forest, and in the pathway on the route to the Great Crater, as far as the elevation of 3000 feet. (Introduced by aboriginal settlers).

———? (No. 5). Procumbent; leaves short, fleshy. On the coast-crater called "Diamond Hill," near Honolulu; also, in the sands of the low isthmus on Maui.

———? nov. sp., (No. 6). Stem suffruticose, excessively scabrous, white; leaves small, hairy. On the arid Leeward portion of Oahu.

——— (No. 7); leaves subsessile. Frequent along the sea-coast; Tauai, Hawaii, and elsewhere.

Gen. Wedelioid, (No. 1). Leaves opposite, deeply divided, lobed and incised; rays yellow. Frequent on West and East Maui, to the elevation of 2500 feet.

(Campylotheca?, No. 1); Bidens-like. Suffruticose, three to five feet high; leaves simple, cuneate at base, ovate, petioled; floret-rays; aken. with only two awns. Frequent in the environs of the Great Crater, and at the upper base of Mauna Roa

———; perhaps not distinct. Low; leaves mostly simple, but sometimes triparted. Sands of the low isthmus on Maui.

——— (No. 2); congeneric; leaves deeply divided, the segments linear, entire. Barren cliffs at the Leeward outlet of the mountain-defile across West Maui.

——— nov. sp., (No. 3); leaves divided. On the Southern or Leeward side of West Maui.—Compare also, the species growing on the basal portion of Mauna Kaala.

——— (No. 4); leaves long, linear, sometimes divided. Found by Mr. Rich on "Hawaii," probably on the West side of Mauna Roa.

———; perhaps distinct. A shrub, six feet high; leaves pinnately-divided; long akenia or seeds. Frequent on the mountains behind Honolulu, at the elevation of from 1500 to 2000 feet.

——— nov. sp., (No. 5). One to two feet high; leaves pinnatisect, dentate; akenia or seeds coiled spirally. On the unwooded portion of the Mauna Kaala ridge.

——— nov. sp., (No. 6). A shrub, ten feet high; leaves pinnately-divided, serrate; flowers larger than in the other species. On the tabular summit of Tauai, about four thousand feet in elevation.

Gen. Compos.? (No. 1). Stem suffruticose, six inches high; leaves hairy, and resembling those of Hieracium, but entire. On the mountain-ridge behind Honolulu, at the elevation of 2500 feet; rare.

Scævola (Kœnigii; bis No. 1 Paumotuan coral-islands to the Feejeean Group). White

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Tripolium; compare Chili, (and No. 11 Peru); Aster of authors. Very small flowers. Growing along the margin of the wet ground near Honolulu; probably introduced, in company with the Jussiæa?, (and by colonial Whites).

Cænotus Canadensis?, (compare United States). Annual. Frequent in barren situations, and probably introduced.

Sonchus oleraceus, (bis Western Oregon, our Atlantic States, North Patagonia, Peruvian Andes, New Zealand, Auckland Islands, Taheiti, and No. 2 Europe). Abundantly naturalized; introduced, probably by colonial Whites.

——— (bis United States, and New Zealand); leaves more prickly, runcinate. Naturalized, growing only in saline marshy ground; introduced by colonial Whites.

Xanthium strumarium, (bis United States, North Patagonia, and No. 1 Egypt). Naturalized; introduced by colonial Whites.

Cressa (compare No. 3 California, Patagonia, and Peru). Margin of saline marshy ground,

plumose tufts on the stem; under surface of the leaves when dry pubescent; flowers rather short. Frequent along the sea-shore; extending sometimes a mile or two inland, to the elevation of a thousand feet.

——— (No. 3); a second species; leaves green on both sides. "South of the Great Crater," Brackenridge. The same species, with fewer serratures and perhaps less smooth, at the upper base of Mauna Roa, at the elevation of about four thousand feet.

——— (No. 4). "Three to four feet high;" leaves broad-lanceolate, serrato-dentate. "District of Puna" on Hawaii, Brackenridge.

——— (No. 5); compare the last species; woolly stipules. North flank of Mauna Haleakala, at the elevation of 6700 feet.

——— nov. sp., (No. 6). A tortuous decumbent shrub, bearing some resemblance to a Portulaca. In the sands of the low isthmus on Maui.

——— (No. 7); a sixth species; compare (No. 3). Leaves sinuately-dentate. On the mountains behind Honolulu.

——— (No. 8). Mr. Brackenridge thinks this distinct from the last; leaves with a few sinuate serratures; flowers yellow. "On the mountains behind Honolulu," Brackenridge.

——— nov. sp., (No. 9). Under surface of the leaves woolly. On the mountain-ridge behind Honolulu, at the elevation of two thousand feet.

——— nov. sp., (No. 10). Lanceolate entire leaves. On the tabular summit of Tauai, about four thousand feet in elevation.

Lobelia (No. 2). Stem simple, ten feet high; leaves lanceolate and rather small, pseudo-crenate; three to four terminal spikes; flowers white, tipped with lilac. Environs of the Great Crater.

——— (No. 3); leaves lanceolate, the under surface white; the spike of dark-blue flowers (naked at base, or) partly separate. On the tabular summit of Tauai; and at the elevation of 6700 feet on the North flank of Mauna Haleakala.

——— (No. 4). Woody; leaves lanceolate, long-petioled, sinuato-serrate; upright racemes or spikes of numerous and rather small flowers. In fertile situations on the mountains behind Honolulu, at the elevation of a thousand feet.

——— (No. 5); normal. Three to five feet high; leaves narrow, lanceolate, attenuate; several terminal long racemes or spikes of pale flowers. Frequent on the mountain-ridge behind Honolulu, at the elevation of from 2000 to 2500 feet.

——— (No. 6). Viscous; leaves lanceolate, a foot long, entire, succulent; sepals short; a single spike of showy, broad and curved flowers, pale-colored with pink veins. On the tabular summit of Tauai.

——— (No. 7). A foot high; leaves broad-ovate, acute at each end, the under surface white, with brown nervures; no flowers. On the mountain-ridge behind Honolulu, at the elevation of two thousand feet.

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near Honolulu and elsewhere. (Possibly introduced, in connection with the manufacture of salt, by colonial Whites).

Batatas edulis, (bis No. 1 Metia to the Feejee Islands); leaves entire, or sometimes 3-lobed. In those districts of the Hawaiian Islands that are unsuitable for the production of taro, the sweet potato is the favorite object of cultivation with the natives. The roots of some of the varieties are white internally, and differ besides in shape from the one variety known in the United States.

———? (No. 8); abnormal. Leaves hispid, or covered with small prickles; axillary or infra-axillary racemes; divisions of the calyx at first short and obtuse, afterwards enlarging and becoming foliaceous; flowers long and curved. On the mountains behind Honolulu, at the elevation of two thousand feet.

———? (No. 9); abnormal. Woody, eight feet high; leaves lanceolate, petioled, two and a half feet in length; flowers rather small, crowded in woolly capit. at ends of the long leafy peduncled infra-axillary raceme. On the mountains behind Honolulu.

———? (No. 10); abnormal. Simple; leaves hairy on both sides, obovate, acute at each end, eleven inches by five and a half, crenulate; horizontal rigid infra-axillary racemes along the stem below the leaves; flowers several, and very small, not more than three-fourths of an inch in length, "greyish-blue. In the forest on Mauna Kea, at the elevation of about two thousand feet," Brackenridge.

———? (No. 11); habit of the last species, but entirely smooth; leaves obovate, acute at each end, entire, fifteen inches long by five and a half wide; the flowers fewer, not expanded. "Forest on the North flank of Mauna Kea," Brackenridge.

———? (No. 12); abnormal. Woody, one to two feet high; leaves crowded, petioled, obovate, with distant serratures; flowers solitary, axillary, large, yellow. On the mountain ridge behind Honolulu, at the elevation of 2500 feet.

———? (No. 13); abnormal. Six feet high, branching; flowers large, blue, in two to three-flowered axillary racemes. Upper base of Mauna Roa, at the elevation of about 4000 feet.

———? (No. 14); abnormal. Simple, upright, five feet high; leaves undulated or waved on the margin, one to two feet long, less prickly than in the next species, and the prickles nearly disappearing in drying; axillary few-flowered racemes; capsule turbinate, truncate. "Puna" on Hawaii, Brackenridge.

———? (No. 15); abnormal; a second prickly species. Stem very prickly; the young stocks with prickly and bi-pinnatilobed leaves, resembling those of some Solanums, and in this state the plant was not seen in flower. The flowering form had entire leaves. In the forest on Mauna Kea, and elsewhere.

———? (No. 16); abnormal. "Five feet high," branching; leaves broad-lanceolate, crenate towards the apex; axillary racemes of a few large green flowers. "Pahuhali," near the course of the new lava-stream, Brackenridge.

———? (No. 17); abnormal. "Ten feet high," branching; leaves broad-lanceolate, crenulate; axillary racemes of a few small blue flowers. Woods at the elevation of 1800 feet a little "below the saw-mill near Hilo," Brackenridge.

———? (No. 18); abnormal. A "branching shrub, eight feet high;" leaves obovate,

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Cordia; bis (No. 1 Taheiti to the Feejee Islands), Gardner's coral-island, and Wake's coral-island. Planted around the dwellings of the natives, in the village of Kaimo and elsewhere; introduced by aboriginal settlers.

Heliotropium Curassavicum? (bis No. 8 Oregon, California, United States, North Patagonia, and Peru.) Frequent in saline marshy ground; (probably introduced, in connection with the manufacture of salt, by colonial Whites).

(Nicotiana tabacum; bis Metia to the Feejee Islands, and No. 6 North America. Planted around the dwellings of the natives; having been introduced by trading and colonial Whites.)

obtuse except a slight point, serrulate, the under surface with slight pubescence; long blue flowers, in axillary, two-flowered racemes. "Forest on the North flank of Mauna Kea, at the elevation of about 3500 feet," Brackenridge.

———? (No. 19); abnormal. A shrub, almost sub-herbaceous, branching; leaves lanceolate, a foot long by two inches wide, serrulate, petioled, short pubescence on the under surface; racemes axillary, few-flowered, upright and incurved; flowers blue, an inch long, the tube rather large. Forest on the North flank of Mauna Kea.

———? (No. 20); abnormal. Leaves somewhat coriaceous or leathery; axillary few-flowered racemes. North flank of Mauna Haleakala, at the elevation of 6700 feet.

———? (No. 21); abnormal. Axillary many-flowered racemes; the flowers very small, slender, and "lilac-colored. Mauna Haleakala, at the elevation of about 1500 feet," Brackenridge.

———? (No. 22); abnormal. Woody; leaves lanceolate, eighteen inches long by two inches wide, crenulate; axillary racemes of curved blue medium-sized flowers. "Mountains on the West side of the gap behind Honolulu," Brackenridge.

———? (No. 23); abnormal. Upright, simple, "four to six feet high;" leaves elongate, a foot long by one and a half inches wide, entire, the margin somewhat waved; flowers "pale blue," rather small, curved. "Low moist places in the forest on Mauna Kea, at the elevation of about three thousand feet," Brackenridge.

Nov. gen. Lobel., (No. 1). Simple stout stem, eight to fifteen feet high; leaves in a terminal cluster, lanceolate and Dracæna-like but waved, two to two and a half feet long; racemes clustered in the axils of the leaves; pedicels with linear bracts; divisions of the calyx linear, two inches long, and longer than the petals, the latter measuring only an inch and a half. Leeward verge of the tabular summit of Tauai, at the elevation of about 3700 feet.

——— (No. 2; possibly congeneric?). Stem stout, a foot high; crowded, strap-shaped, coriaceous, margined, almost imbricate leaves; no flowers. On the mountains behind Honolulu, at the elevation of from 2500 to 3000 feet.

Cyanea Grimesiana, Gaud. (No. 1); long large calyx. Mountains behind Honolulu, at the elevation of fifteen hundred feet.

——— (No. 2); the pinnatifid kind formerly obtained by Nuttall; perhaps a distinct species. Runcinate leaves. In the mountain-defile across West Maui, at the elevation of about 2000 feet.

——— (No. 3). Stem simple, "six feet high;" leaves three feet long, narrow, long-petioled; flowers crowded at base, three inches long, blue, the outer surface hairy; divisions of the calyx elongate. "Forest on the Windward flank of Mauna Kea, at the elevation of about 3000 feet," Brackenridge.

Physalis (angulata?; bis Taheiti to the Feejee Islands). Small, smooth. Naturalized around Wailuku on Maui, and elsewhere; introduced by aboriginal settlers.

(——— edulis; bis Taheiti to the Feejee Islands, and compare No. 7 Chili and Peru. Abundantly naturalized; having been introduced by aboriginal settlers).

Solanum (bis No. 8 Feejee Islands). Brought by our Expedition, and seeds planted at Honolulu.

——— (Jacquini?). Long prickles all over the leaves and other parts of the plant, and long scattered hairs; fruit as large as a cherry, bright orange, often worn for ornament

Gen. Lobel., the calyx-teeth minute, (No. 1). Leaves deltoid, abrupt at base, pointed, sinuately-serrate; axillary racemes of curved pale flowers. "Mountains behind Honolulu," Brackenridge.

——— (No. 2; possibly congeneric?). Stem swollen and bulb-like at base, simple, straight, four to eight feet high, with a crown of leaves at the summit; the leaves deltoid and undulated. Clinging to the face of lofty precipices in the mountain-defile across West Maui.

Nov. gen. Lobeliac., (No. 1) Twenty feet high; large green flowers; calyx not distinguishable, seeming continuous with the corolla, the capsule being small and crowned with the thickened rim. On the mountains behind Honolulu; and in the mountain-defile across West Maui.

Gen. Lobel. with pinnatilobed leaves, (No. 1). A foot high; curved; few branches; leaves smooth; no flowers. "On the tabular summit of Tauai," Brackenridge.

Vaccinium nov. sp., (No. 2). A shrub of medium size, often epidendric on the branches of trees in the deep forest on Mauna Kea; when growing beneath on the ground, sometimes twenty feet high with the trunk three inches in diameter; the flowers small, cylindrical, greenish. North flank of Mauna Kea, at the elevation of from 4000 to 5500 feet; Mauna Haleakala, at the elevation of from 3000 to 6700 feet; and apparently the same species on the mountains behind Honolulu.

Gen. Lubinioid, (No. 1); but the floral envelopes 6-parted. Mauna Haleakala, at the elevation of 6700 feet.—Apparently the same species on the mountains behind Honolulu, but the leaves seeming more coriaceous, veiny, white beneath, and shorter.

Myoporum (No. 1); in some respects reminding one of Samolus. A tree, forty feet high; leaves alternate. "Mauna Roa, at the elevation of 5000 feet," Brackenridge. Upper margin of the forest on Mauna Kea, and extending into the pastoral district to the elevation of 7200 feet.

——— (No. 2); a second species. A low decumbent shrub, with smaller acuminate leaves; viscous at the summit; fruit crowded. Southern base of Mauna Kaala, submaritime; also along the Southeast coast of Hawaii.

(Myrsine Sandwicensis of A. Dec.?, No. 3); Ardisiac. A small tree, thirty feet high, with the trunk a foot in diameter; leaves like those of Arbutus uva-ursi; flowers small, purplish. On the lava-mountain of Puhuruhuru not far from the Great Crater, and in other localities. The same species on the mountains behind Honolulu, the under surface of the leaves glaucous, and no flowers.

———; perhaps distinct; the leaves seeming narrower. On the mountains behind Honolulu.

Gen. Ardisioid, (No. 1). A tree, forty feet high; leaves obovate, cuneate or somewhat

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by the natives. Naturalized around Honolulu; introduced, probably by colonial Whites.

——— nigrum? (bis Taheiti to the Feejee Islands, and compare No. 28 California, Chili, and Peru.) Taller than in our Northern climates, and the leaves seeming more prominently toothed; fruit edible. Naturalized; frequent even in wild situations; having been introduced by aboriginal settlers.

(Capsicum frutescens; bis Taheiti to the Feejee Islands, and No. 4 Peru. Observed under cultivation by Mr. Rich).

attenuate at base; calyx 5-fid; fruit solitary, peduncled, arising along the woody stem below the leaves. Forest on Mauna Kea, at the elevation of 6000 feet.—Apparently the same species, in the district of Puna.

———; perhaps distinct from the last. Only a shrub. On the mountains behind Honolulu.

Maba (No. 7); but no flowers. A tree, thirty to forty feet high; leaves small, twisted, dull, and minutely reticulate. On the mountains behind Honolulu.

——— (No. 8); "distinct from the last," according to Mr. Brackenridge; the leaves larger. "North flank of Mauna Kaala."

Alyxia (No. 9); lanceolate, rather long leaves; the fruit rather large. On the mountains behind Honolulu.

——— (No. 10). Stem white; leaves broad; flowers small; fruit large, pointed. Oahu.

——— (No. 11); leaves linear obtuse; fruit small, and apparently moniliform. Southern base of Mauna Kaala.

——— (No. 12). A woody vine; the leaves odorous, and often gathered by the natives.

——— nov. sp., (No. 13); near A. scandens. A vine; the fruit large, eaten by the natives.

(Rauwolfia Sandwicensis?, No. 1; recorded as) Ophioxyloid?, see Gærtner. Leaves verticillate, petioled; fruit bilobed. On the "mountains on the West side of the gap behind Honolulu," Brackenridge; rare.

Gen. Loganioid, (No. 1). Four to five feet high; leaves in terminal fascicles, subsessile, penninerved, the under surface white with numerous dark nervures; fruit 2-3-valved, the seeds numerous. On the mountains behind Honolulu, at the elevation of 1500 feet.

Geniostoma (No. 6); a congener of Feejeean sp.; leaves rather narrow; terminal corymbs. "On the mountains on the West side of the gap behind Honolulu," Brackenridge; rare.

———? (No. 7). Leaves obovate, somewhat coriaceous; lax or pendent cymes; corolla 5-fid, hairy inside, the tube a fourth of an inch long. On the tabular summit of Tauai.

Labordia? (No. 5). A small tree, fifteen feet high, with the trunk five inches in diameter; leaves opposite, entire, cushioned at base, or rather forming a short sheath; capsule 2-valved, ovoid, three-fourths of an inch long; style persistent; seeds small, and numerous. "Forest on the North flank of Mauna Kea, at the elevation of 2000 feet," Brackenridge.

——— (No. 6); compare the last species. Leaves large, lanceolate, sheathing at base, the under surface hairy; no flowers. On the mountains behind Honolulu.

Cyrtandra (No. 12). Sub-herbaceous, two to four feet high; leaves broad-lanceolate,

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Datura stramonium, (No. 1; bis United States, and compare Chili and Peru). Naturalized around Honolulu; in barren places a low annual, and ripens quicker than elsewhere; introduced, probably by colonial Whites.

Stachytarpha; bis Tongatabu, and compare (No. 1) Rio Janeiro The stem shrubby. Abundantly naturalized; growing in beds in the environs of Hilo; having been introduced by colonial Whites.

Amaranthus (compare No. 1 Metia and Samoa); leaves lanceolate, veiny. "Hawaii," Mr. Rich; and apparently the same species, with prominent white nervures, on Tauai. Introduced, probably by colonial Whites.

crenate; flowers pedicelled, solitary or sometimes in pairs. In woods between the Great Crater and Mauna Roa.—The same species? on the mountain-ridge behind Honolulu, suffruticose and smooth.

——— nov. sp., (No. 13). "Eight feet high," blackish and ferruginous; leaves large, ovate, acute at each end, long-petioled; umbels axillary, peduncled, about 5-flowered. "Deep woods between Puna and Pahuhali," Brackenridge; rare.

——— (No. 14). "Ten feet high;" leaves large, cordate, the pubescence ferruginous; umbels peduncled, about six-flowered. "Woods between Puna and Pahuhali," Brackenridge.

——— (No. 15); leaves large, round-cordate, woolly. On the mountains behind Honolulu, at the elevation of 1500 feet.

——— (No. 16). Under surface of the leaves white and woolly; calyx involucral, or enlarged and rotate, white. Frequent on the mountains behind Honolulu, at the elevation of 1500 feet.

——— (No. 17); broad-lanceolate leaves, ferruginous pubescence. Oahu, (on the mountains behind Honolulu).

——— (No. 18); leaves broad-lanceolate, glaucous beneath, the nervures ferruginous; calyx as long as the corolla; flowers from the old wood of the stem. On the mountains behind Honolulu, at the elevation of 1500 feet.

——— nov. sp., (No. 19); leaves smooth, long-petioled, coarsely serrate; calyx as long as the tube of the corolla. On the mountains behind Honolulu.

Gen. near Cyrtandra?, (No. 1); but the fruit hardly a berry. "A shrub, ten feet high," habit of Urticeæ; leaves opposite, petioled, broad-ovate, serrate; flowers inconspicuous, but a distinct corolla, probably monopetalous; calyx small, with five equal teeth; stigma much like that of Lobelia, geniculate, and finally deciduous at articulations; capsule Myoporum-like, two-celled, containing many minute seeds. "Base of the mountains behind Honolulu," Brackenridge.

Convolvulus nov. sp., (No. 1); leaves sagittate; umbels peduncled; flowers small, white. Hilo, C. P.

(Batatas pentaphylla?, No. 2). Annual; leaves quinate, hairy. Along the Southern base of Mauna Kaala; also, at Lahaina on West Maui.

(Ipomoea) turpethum?; bis? (compare No. 1 Metia to the Feejeean Group, and Phœnix and Wake's coral-islands); differing from Samoan in the corolla not being contracted into a distinct tube; leaves broad-cordate; flowers rather small, white. Rocks on the North coast of Hawaii.

(——— pes-capræ; bis Brazil, and No. 2 Metia to the Feejee Islands). Frequent along the sea-shore; Hilo, the Southeast portion of Hawaii, and elsewhere.

Polygonum (No. 1; compare Taheiti, New Zealand, Australia, California, and Chili). In wet ground on Oahu; also, on bank of stream in the forest on Mauna Kea, but not far from Hilo.

Atriplex (halimus?); like A. patula of the United States. A foot high; crowded. In the artificial saline marshy ground at Honolulu; perhaps introduced, in connexion with the manufacture of salt, by colonial Whites.

Salicornia (compare United States). Perhaps introduced, in connexion with the manufacture of salt, by colonial Whites. No specimens.

(——— ?, nov. sp., No. 6); leaves quinate, smooth; flowers small. Tauai.

(——— ovalifolia?, No. 7). Prostrate; leaves with a bilobed apex; flowers small. On the arid Leeward portion of Oahu, Maui, and the other islands. The root said to be "tuberous and edible."

(Stylismoid nov. sp., No. 1). Stem woody at base, tortuous, decumbent, the upper portion herbaceous and climbing; flowers solitary. Habit of the New Jersey Evolvuloid. Growing along the Southern base of Mauna Kaala.

(Pharbitis insularis?, No. 2); leaves broad-cordate, entire, sericeous; calyx-teeth long, pointed. On the Southern flank of Mauna Kaala.

(——— No. 3); compare the last species. Leaves cordate, flowers blue. Frequent in the outskirts of the forest.

Cuscuta (No. 1). On plants growing in the sands of the low isthmus on Maui; and said by the natives to be indigenous.

Heliotropium nov. sp., (No. 1). A fine species; silvery-tomentose; cyme peduncled. Forming beds on the sea-shore South of Mauna Kaala.

Solanum nov. sp., (No. 9). A procumbent shrub; the leaves cordate, entire. In the sands of the low isthmus on Maui.

——— nov. sp., (No. 10); short close tomentum; a few short spines on the leaves. Found by Mr. Rich "on Hawaii," probably on the Western side of Mauna Roa.

——— (No. 11); near Feejeean species. A shrub, six to ten feet high, unarmed; under surface of the leaves white. On the mountains behind Honolulu, frequent at the elevation of fifteen hundred feet.

——— nov. sp., (No. 12); near S. verbascifolium; and a shrub. On the Leeward verge of the tabular summit of Tauai, at the elevation of about 3700 feet.

Nov. gen. Solandroid, (No. 1). A tree; twenty feet high, with the trunk five inches in diameter, and "the wood greenish;" habit of Solandra viridis; the flowers greenish, but small; leaves oblong-ovate; calyx apparently bifid, corolla 4-fid. "Between the Great Crater and the upper base of Mauna Roa," at the elevation of about 4000 feet, Brackenridge; rare.

——— (No. 2). Lycium-like; leaves broad-lanceolate, or obovate-acute; flowers solitary, peduncled, calyx obsoletely 2-3-dent. On the mountains behind Honolulu, at the elevation of 1500 feet; once only met with.

(——— No. 3); gen. Cestroid. Twelve feet high; leaves broad-obovate, petioled; calyx bifid; corolla tubular, two-thirds of an inch long, 4-fid. On the Mauna Kaala ridge.

Lycium nov. sp., (No. 1); calyx 4-dentate; corolla 4-fid; berry saline to the taste, but edible. On the barren coast-crater called Diamond Hill, near Honolulu.

Nama? (No. 1). Annual; very small, three to five inches high; delicate purple flowers. Sands of the low isthmus on Maui.

Herpestis Monnieria, (No. 1, bis Brazil and Peru). Maritime; growing along the sea-

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Aleurites triloba, (bis No. 1 Metia to the Feejee Islands). Naturalized; a frequent tree, growing spontaneously throughout the lower portion of the Windward and more fertile districts, and sometimes forming groves; but the foliage of a lighter green than in Southern Polynesia, as though unhealthy. Introduced by aboriginal settlers.

Ricinus communis, (No. 1, bis Feejee Islands). Abundantly naturalized; having been introduced by aboriginal settlers.

shore of Oahu. The same species apparently, but with white flowers, growing on the North coast of Hawaii. (Specimens from the Marquesas Islands are mentioned by Persoon in A. D. 1805, a date too early for the plant to have been introduced there by colonial Whites).

Ocymum; compare (No. 1 Samoa to the Feejee Islands); small leaves. Frequent on the Southeast portion of Hawaii.

——— (No. 2); habit of the last species; leaves woolly on both sides. (Tauai; and perhaps on Oahu).

Phyllostegia (No. 1); leaves reticulate; flowers small, pink or rose-colored. Near the Great Crater, at the elevation of about 4000 feet.

——— nov. sp., (No. 2); setose, bristly; flowers white; calyx very large, and flowers rather small. "Puna" on Hawaii, at the elevation of about 4000 feet, Brackenridge.

——— (No. 3); a third species. Leaves smooth, subcordate; calyx-teeth short; flowers large, purple, and ornamental. Frequent throughout the forest on Mauna Kea, and in other localities.

———; perhaps not distinct from the last; leaves sessile. In the mountain-defile across West Maui.

——— (No. 4). Salvia-like, trailing; teeth or rather lobes of the calyx, broad and somewhat obtuse; flowers small, white. In the forest on Mauna Kea, at the elevation of 4500 feet.

——— nov. sp., (No. 5); hirsute. In the forest on Mauna Kea.

——— nov. sp., (No. 6); pilose; calyx much smaller than in the last species, and the teeth rather short. In the forest on Mauna Kea.

——— nov. sp., (No. 7); entirely smooth; leaves argutely serrate; long pet.; teeth of the calyx nearly obsolete; flowers white. In the forest on Mauna Kea, at the elevation of 3000 feet.

——— nov. sp., (No. 8). Not trailing; habit of Salvia; leaves cordate-ovate, with a deep sinus. In the sands of the low isthmus on Maui.—The same species perhaps, on barren ridges on Tauai, the leaves seeming narrower, with the under surface whiter, the flowers long and white.

——— nov. sp., (No. 9); ornamental; slender white flowers tipped with pink. In the mountain-defile across West Maui.—Apparently the same species on the mountains behind Honolulu, the under surface of the leaves seeming more reticulate.

——— (No. 10); largest, white flowers; coarse serrate leaves. On the mountains on Oahu, and on West Maui.

——— (No. 11); habit of the last, but much smaller; entirely smooth. In the mountain-

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Urtica urens?. Found by Mr. Rich "on Hawaii." Probably introduced by colonial Whites.

Morus alba, (bis Taheiti, United States, and No. 2 Northern Asia). Both the Chinese and multicaulis varieties seemed in flourishing condition on the silk plantations on Tauai; having been introduced by colonial Whites.

Broussonetia (No. 1, bis Metia to the Feejee Islands). "Largely cultivated by the natives," according to Mr. Brackenridge.

Artocarpus incisa, (No. 1, bis Metia to the Feejee Islands). Cultivated on the Windward and more fertile portion of the Group, and principally at Hilo; but of late years much neglected.

defile across West Maui. The same species? on the mountains behind Honolulu.—Young Phyllostegias creeping on the base of trees, sometimes resembled small lobed-leaved species of Hydrocotyle.

Nov. gen. Phyllostegioid, (No. 1). Rigid, upright, "eighteen inches to two feet high;" leaves large; racemes below the leaves, bristly; flowers deep violet, and ornamental; calyx dividing into five narrow equal lobes. "Woods in the district of Puna," rather rare, Brackenridge.

Gen. Durantoid, (No. 1). Decumbent, with the branches upright, and two to three feet high; flowers labiate, blue, ornamental. Tauai; and in the sands of the low isthmus on Maui.

Plumbago (No. 3; compare No. 2 Feejee Islands); furfuraceous beneath. Tauai, and elsewhere.

Boerhaavia (compare Paumotuan to Phœnix and Wake's coral-islands). Prostrate, smooth; having small and purple flowers. Maritime; growing on rocks on the Southeast coast of Hawaii.

Pisonia (No. 1). Arborescent, becoming a small tree; seen wild, and often reserved. Oahu, and elsewhere; the birdlime used by the natives was said to be procured from this plant.

Plantago (No. 1). Smooth; stem a foot high; leaves broad, 7-ribbed, the petioles amplexicaul at base; spikes from below the leaves. Maritime; growing among stones by the sea-side, at the Northern base of Mauna Kea.

——— Queleniana, (No. 2). A shrub; usually upright, but sometimes trailing. On the mountains behind Honolulu.—Apparently the same species in West Maui, with larger leaves; and again, six to ten feet long with the stem half an inch in diameter, on the North flank of Mauna Haleakala, at the elevation of 6700 feet.

Gen. Alternantheroid ?, (No. 1); but the leaves opposite. A shrub, four to five feet high. "Near the sea, South of the Great Crater," Brackenridge.

Achyranthes (No. 3); very woolly. Oahu; and near Lahaina on West Maui.

Charpentiera (No. 1); leaves large, penninerved, ovate, obtuse at base. On the mountains behind Honolulu.

——— (No. 2); a second species. Smaller, with smaller flowers; leaves elliptical, lanceolate. On the Mauna Kaala ridge.

Chenopodium (No. 1). Stem suffruticose, or even woody at base. On the arid leeward portion of Oahu.

Phytolacca (No. 1); referred by Hooker to P. Abyssinica, (if correctly, the species has been misnamed). Rambling; leaves when fresh, strongly and remarkably reticulate, but this character disappears in drying; styles about five; berries reddish. On the

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Piper methysticum, (bis No. 6 Samoa to the Feejee Islands). Seen under cultivation on the South flank of Mauna Kaala; (having been introduced by aboriginal settlers).

Canna Indica, (bis Taheiti to the Feejee Islands, and No. 1 Brazil and Lower Peru); scarlet flowers. Said to have been "brought from China by the way of Maui." Seen only in the Mission garden at Hilo.

——— (No. 5 Tropical America); a second species. Yellow-flowered; and "the only kind cultivated here in former times." Naturalized in the gorge leading back from Honolulu.

mountains behind Honolulu; and throughout the forest on Mauna Kea, to its termination at 6700 feet.

Rumex (No. 1). Seeming normal; leaves elongate, short hairs below. On the Mauna Kaala ridge.

Cassyta; compare (No. 1 Paumotuan to the Otafuan coral-islands and the Feejeean Group). On the mountains behind Honolulu, and elsewhere; and especially frequent on the Southeast coast of Hawaii.

Daphne; compare (No. 1 Taheiti to the Feejee Islands). Sprigs, if placed in streams, are said to "poison the fish all the way to the sea."

——— (No. 2). Five feet high; leaves larger, ovate; flowers crowded at the end of the branches. "Pahuhali," near the new lava-stream, Brackenridge.—Apparently the same species, on the mountains behind Honolulu.

——— nov. sp., (No. 3); large leaved; berries elongate. Mauna Haleakala; and in the mountain-defile across West Maui.—Apparently the same species, the leaves broad and margined, on Tauai.

——— nov. sp., (No. 4). A fine species; prostrate; short side-branches, with dense-flowered terminal spikes. On the dry portion of the mountain-ridge behind Honolulu.

——— (No. 5); leaves large, white beneath. "Waialua, at the Western end of Oahu," Rich and Brackenridge.

——— (No. 6). Small; willow-leaved. Environs of the Great Crater and on Mauna Roa, at the elevation of from 4000 to 6700 feet.

Santalum nov. sp., (No. 3); leaves narrow, the upper surface shining; flowers unusually large, the tube of the corolla a sixth of an inch long. On the arid Leeward verge of the tabular summit of Tauai; confined, like the other Hawaiian species, to barren mountainous situations, but in one exceptional instance, growing in the middle of the wide plain-like valley between the two mountain-ridges on Oahu.

——— (No. 4); flowers tinged with reddish, and by no means inconspicuous. From the elevation of 6000 to 6500 feet on Mauna Haleakala.—Apparently the same species, with broad leaves, glaucous beneath, and the flowers less showy, not unfrequent on Mauna Roa.

——— ? (No. 5). A diminutive species; leaves thin, roundish, very small, only two-thirds of an inch in diameter; but flowers in axillary panicles, and very small; calyx 4-fid, the corolla not made out. On the Southern flank of Mauna Kaala.

Phyllanthus (No. 4); leaves elliptical, obtuse. "On the mountains West of the gap behind Honolulu," Brackenridge.—Apparently the same species, on Tauai.

Zingiber (zerumbet; No. 1, bis Samoa to the Feejee Islands.) Abundantly naturalized; growing in wild rich shady situations at the commencement of the forest.

Curcuma (No. 1, bis Taheiti to the Feejee Islands); turmeric; the powdered root said to have been "formerly used by the natives in dyeing tapa." Neither the roots, nor the living plant, seen by ourselves.

Musa paradisica, (No. 1, bis Metia to the Feejee Islands); the banana. Abundantly cultivated, and also naturalized; introduced by aboriginal settlers.

——— nov. sp., (bis No. 2 Taheiti); the "fehi." A few stocks, "brought from Taheiti," seen in Mr. Pitman's garden at Hilo.

——— nov. sp., (No. 5); shrubby, small-leaved. On the mountains behind Honolulu.

———; seeming distinct from the last; small-leaved, low. In the "Pali," or precipitous outlet of the gap back of Honolulu.

(Glochidium, No. 6; recorded as) Bradleya; but no flowers. On the mountains behind Honolulu.

Euphorbia (No. 4). Shrubby; leaves elliptical, entire, somewhat coriaceous. On the mountains behind Honolulu.

——— (No. 5). A "low tree, twelve feet in height;" leaves small, narrow-elliptical, the under surface with blackish veins. "On the mountains behind Honolulu," Brackenridge.—Apparently the same species, lanceolate-leaved, forming low groves in open situations on Mauna Haleakala, at the elevation of from 1500 to 3000 feet; one stock measuring fifteen feet by four inches.

———; near the last; the leaves more distinctly petioled, and less conspicuously black-veined. On the mountains behind Honolulu.

——— nov. sp., (No. 6). Woody, tortuous, decumbent, six to eleven inches high; leaves round-cordate, obtuse, entire. On the arid coast-crater called Diamond Hill, near Honolulu.

——— nov. sp., (No. 7). A shrub; flowers in axillary clusters. Tauai.

——— (No. 8). Woody; leaves linear, obtuse. Tauai.

Gen. near Croton, (No. 1). A shrub; leaves oblong, attenuate, serrate; flowers in strings or long filiform aments. On the Mauna Kaala ridge.

Gen. near Elatostema, (No. 1). A shrub, six to eight feet high; leaves large, broad-ovate, penninerved; capitul. in cymes; branching. On the mountains behind Honolulu.

——— (No. 2); a second species. Large rough leaves. Tauai.

(Epicarpurus No. 4); compare Feejeean genus. Morus-like; eight feet high; leaves lanceolate, serrate, with a yellow midrib; flowers very inconspicuous, two or three together; two long stigmas. On the mountains behind Honolulu.

(———); perhaps the same species. Dioecious; male flowers in aments, while female solitary. On the Mauna Kaala ridge.

(——— No. 5); Morus-like. A shrub, three to four feet high; leaves ovate, acuminate, dentate. Upper margin of the forest on Mauna Kea, at the elevation of 6700 feet.

Gen. near Urtica, (No. 1). A shrub; leaves alternate, smooth; peduncled many-flowered cymes; small fruit. On the mountains behind Honolulu.

——— nov. sp., (No. 2). Eight to twelve feet high; leaves only at the end of the branches, broad-ovate, an inch long, serrate, short-petioled, apparently alternate; flowers axillary, subsessile, crowded, thus forming term. head. South flank of Mauna Kaala.

Procris, (No. 5); the "tapa plant." Arborescent, fifteen feet high, spreading; leaves

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Amaryllis aulica, (No. 3 Tropical America). In a garden on Tauai; introduced from Brazil by colonial Whites.

Allium cepa, (bis Feejee Islands, Peru, the United States, and No. 1 Europe); the onion. Now cultivated by the natives; having been introduced by colonial Whites.

Furcræa gigantea, (bis No. 1 Brazil). In gardens on Tauai; having been introduced by colonial Whites.

Dioscorea (bulbifera; compare No. 1 Metia to Samoa); broad-leaved. Growing spontaneously.

acuminate, the under surface less white than in Samoan. Puna and Mauna Roa, as far as the elevation of 5000 feet.—Apparently the same species, the flowers seeming smaller and more congested, on the mountains behind Honolulu.

Neraudia (melastomæfolia, Gaud., No. 1); very smooth. On the mountains behind Honolulu.

———? (No. 2); compare the entire-leaved species of Oahu; the under surface of the leaves softly pubescent. Tauai.

Parietaria? (No. 1); minute. "Puna" on Hawaii, Brackenridge; and the same species on Oahu.

———? (No. 2); perhaps distinct; larger; four to seven inches high. In the mountain-defile across West Maui.

Peperomia (No. 10). A foot high; leaves verticillate in fives or more; long spikes. Upper margin of the forest on Mauna Kea, at the elevation of 6700 feet.

——— (No. 11). Two to three feet high; leaves opposite, the veins pubescent beneath. Frequent in the Inferior portion of the forest on Mauna Kea, from the elevation of 2000 to 4000 feet; growing on the ground, like a forest-shrub, and taking the place of the Pipers of Southern Polynesia.

——— (No. 12). Small; leaves fleshy, verticillate. On trunks of trees in the forest on Mauna Kea.

——— (No. 13); resembling the last, but hairy, and the leaves opposite, or only in pairs. Upper portion of the forest on Mauna Kea, at the elevation of from 4000 to 6700 feet.

——— (No. 14). Ornamental; leaves opposite, petioled, the under surface purple, with white veins. Frequent throughout the forest on Mauna Kea, to its termination at 6700 feet.

——— nov. sp., (No. 15); verticillate, crowded leaves; a single large terminal spike. On the mountains behind Honolulu.

——— (No. 16); leaves opposite, about 5-nerved, the under surface white. "Puna," Brackenridge.

Gen. Urticac.?, (No. 1). A fleshy or stout-stemmed tree, thirty feet high; leaves long-petioled, ovate, obtuse, entire yet somewhat resembling those of a pear tree, apparently alternate, at the end of the branches; no flowers. South flank of Mauna Kaala.

Gen. incert., with flattened nut, (No. 1). Habit of Glochidium; woody; leaves alternate, elliptical, entire; apparently several styles; nut flattened, having irregular ridges; small 5-fid calyx at base. Tauai; and on the mountains behind Honolulu.

(——— No. 2; congeneric with the last?). Habit of Phyllanthus and Cuban Casearia;

——— pentaphylla; bis (No. 3 Taheiti to the) Feejee Islands; the "pia." Seen flowering; the purple kidney-shaped root "eaten in times of scarcity." Naturalized; growing often in wild situations; and abounding around Pahuhali near the new lava-stream. Introduced by aboriginal settlers.

Tacca pinnatifida, (No. 1, bis Metia to the Feejee Islands). Abundantly naturalized; having been introduced by aboriginal settlers. Arrow-root from this plant, manufactured in large quantities by the natives.

Dracæna terminalis, (No. 1, bis Metia to the Feejee Islands). The sweet-rooted variety, which was not seen at Taheiti nor at Samoa, is the only kind here; and is abundantly naturalized in wild rich shady situations at the commencement of the forest.

a shrub; leaves alternate, ovate, subsessile; flowers minute, in axillary tufts. "Waialua, at the Western end of Oahu," Rich and Brackenridge.

Gen. incert. with Prunus-like leaves, (No. 1). "A tree, thirty feet high with the trunk ten inches in diameter;" flowers minute, in long compound axillary racemes; calyx 5-leaved. Lower portion of the forest on Mauna Kea, "at the saw-mill" near Hilo, Brackenridge.

Ruppia (compare No. 1 Feejee Islands, United States, and Peru). In the artificial pools for making salt, near Honolulu.

Potamogeton (No. 1); the leaves all linear and grass-like: fr. capitate, the carpels not Planorbis-like. Taro-ponds, on Oahu and at the Northern base of Mauna Kea.

——— (No. 2); the upper leaves lanceolate-elliptic. Oahu.

Halophila; compare (No. 1 Samoa to the Feejee Islands). Marine; growing in sea-water in front of Honolulu, and of Lahaina on Maui.—Possibly a distinct species in company, having linear leaves.

(Liparis?, No. 1); a congener of Malaxis liliifolia, and having a similar stem-bulb, which seems to account for its becoming epidendric; for in the drier portions of the forest, it grows often on trunks of trees, taking the place of the genuine epidendric Orchidaceæ; the stem taller than in M. liliifolia. Mountains behind Honolulu; also, in the Puna District on Hawaii; and elsewhere.

Gen. Neottioid, (No. 6). Tenderly herbaceous; flowers greenish. "Puna," Brackenridge.—Apparently the same species, a foot high, with small green flowers, on the mountains behind Honolulu.

———; seeming larger and stouter than the last; flowers green. "Puna," Brackenridge.

——— (No. 7). Tauai.—Old stems apparently of the same species, on the North flank of Mauna Haleakala, in a marshy spot at the elevation of about 6700 feet.

Gen. near Neott., (No. 3); seeming a congener of Feejeean species. Six to eight inches high; slightly pubescent; conspicuous yellow flowers. On the mountain-ridge behind Honolulu.

Dianella; compare (No. 1 Taheiti to the Feejee Islands). On Hawaii, and the other islands; in the environs of the Great Crater extending as far as the elevation of 6500 feet on Mauna Roa.

Smilax (No. 4); smooth; leaves ovate, reticulate on both sides; large oblong and white?

Commelina (No. 1, compare Samoa to the Feejee Islands); blue-flowered. Abundantly naturalized, abounding in half wild situations, and sometimes forming patches; introduced by aboriginal settlers.

Cocos nucifera, (bis Paumotuan coral-islands, and No. 1 Tropical America). Cultivated, but not very abundantly, and of late years much neglected. Introduced by aboriginal settlers.

Pandanus (bis No. 1 Paumotuan to the Phœnix coral-islands, and the Feejcean Group). On the Windward side of the islands, scattered singly in the same manner as on the Leeward side of the Feejeean Group. Observed also under cultivation.

Colocasia macrorhiza, (bis No. 1 Metia to the Feejee Islands). Said to have been carefully cultivated in former times; but of late years, much neglected.

——— antiquorum, (No. 2, bis Metia to the Feejee Islands). Abundantly cultivated;

berries. At the elevation of 2000 feet on the mountains behind Honolulu; on Mauna Haleakala, as far as the elevation of 6700 feet; and along the new lava-stream on Hawaii.

Dracæna nov. sp., (No. 2). Differing from other species in habit, being a stemless tree, with numerous upright branches ten to fifteen feet high; leaves lanceolate, ten inches long, no midrib; fruit red, and much larger than in the other species, consisting of three one-celled berries, each containing a round corneous seed as large as a pea. On the South flank of Mauna Kaala.

(Hamelinia) Menziesiana, (No. 3); Astelia of authors; the upper surface of the leaves woolly. Growing on the ground more frequently than in the tree-tops; and abounding on Hawaii, and on the mountains behind Honolulu, and elsewhere.

———; perhaps distinct; the upper surface of the leaves smooth. In the mountain-defile across West Maui.—Another variety, or possibly species, with the leaves very long and narrow, was found by Mr. Couthouy.

Nov. gen. Palmac., (No. 1). "Twenty-five feet high, with the trunk fourteen inches in diameter, and tapering to below the fronds;" the fronds pubescent, flabellate, retaining their elasticity when dry, so that they can be unfolded and used as a substitute for umbrellas; flowers in racemes, which are like those of the date-palm; calyx-scales very small; nuts of the size of a small apple, the shell thin and adhering to the rind, the cicatrix of the seed directly over the receptacle; kernel large and not adherent, being hard, solid, and almost horny. Growing only in one locality; which is "in the midst of the forest at the elevation of about 3500 feet, and six miles back of the Hilo saw-mill," Brackenridge.

Freycinetia (No. 7); near (No. 1) Taheiti. Decumbent in great profusion, forming thickets within the forest, on the mountains behind Honolulu and elsewhere.

——— (No. 8); the floral or rather involucral leaves orange-colored. Abounding in the Lower portion of the forest on Mauna Kea, climbing to the tree-tops.

——— (No. 9); perhaps distinct; larger than the Oahu species, and devoid of colored involucral leaves. Stem branching; the leaves tapering gradually to a long point, and not suddenly contracted. In the Lower portion of the forest on Mauna Kea.

Nov. gen. Asparag.?, (No. 2). Olyroid; six to eight feet high; leaves ribbed, three to four inches wide, the petiole sheathing as in grasses, and with vestiges of stipels; a large panicle; calyx 6-fid, coriaceous; berry containing three round seeds. On the mountains behind Honolulu, at the elevation of 1500 feet.

Scleria? (No. 8); near (No. 1) Taheiti. Large; leaves long, convolute in drying; con-

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the roots, cooked and made into a fermented sour paste called "poi," constitute the principal food of the natives.

Scirpus lacustris?, (No. 1); inflorescence subterminal. Abundant; filling the wet ground, on Oahu and elsewhere; possibly indigenous.

——— maritimus, (No. 2, bis United States). In the artificial saline marshy ground near Honolulu; having perhaps been introduced with the manufacture of salt by colonial Whites.

Kyllingia (monocephala; bis Rio Janeiro, Peru, and No. 1 Taheiti to the Feejee Islands). In the environs of Honolulu.

Panicum capillare? (No. 8, compare United States). Frequent at Lahaina on West Maui, and in other localities; (possibly) introduced by colonial Whites?

spicuous, compound, leafy, blackish, coarctate panicle. On the mountains behind Honolulu, C. P.

——— (No. 9); sheaths trialate; seed smooth. "District of Puna, forming small beds in wet places near woods," Brackenridge.

——— (No. 10); perhaps distinct; smallest. Environs of the Great Crater.

Rhynchospora (No. 2). Small, and slender. Puna, and between Hilo and the Great Crater; filling marshy spots in the inequalities of the lava-surface.

———? (No. 3); stout, many-flowered. In the forest on Mauna Kea, at the elevation of three thousand feet: and apparently the same glaucous species, on the mountains behind Honolulu.

——— nov. sp., (No. 4). Having gladiate Iris-like leaves, six to eight feet by three-fourths of an inch. On the mountains behind Honolulu, at the elevation of from 1500 to 2000 feet.

——— (No. 5); long-beaked. On the mountains behind Honolulu; also, on Hawaii.

Nov. gen. near Rhynchospora, (No. 1). Stem six to ten feet high; leaves six or eight feet long, coriaceous, the margin minutely serrated; inflorescence as in Rhynchospora, but fr. roundish and not conspicuously beaked; florets very numerous. Met with only along the stream back of Honolulu, C. P.

Fimbristylis (No. 7). Humble, only two to four inches high. On maritime rocks on Oahu, and the Southeast coast of Hawaii; growing also around the Great Crater.

——— (No. 8); smaller than F. spadicea. Towards the South-east coast of Hawaii, growing on the old lava-surface.

Eleocharis (No. 3). In wet situations, on the mountains behind Honolulu, at the saw-mill near Hilo, and elsewhere.

Cyperus (No. 5); spikelets of from twelve to sixteen striate florets. Growing in the environs of the Great Crater, and ceasing on Mauna Roa at the elevation of 5000 feet.

——— (No. 6). Humble, only two to four inches high; spikelets about ten-flowered. In the environs of the Great Crater; and observed by Mr. Brackenridge "in barren places on Diamond Hill," near Honolulu.

——— nov. sp., (No. 7). Large and fine. In the mountain-defile across West Maui.

——— (No. 8); near C. flavescens; spikelets of about twenty florets. On the mountains behind Honolulu.

Mariscus nov. sp., (No. 3). Four feet high, stout; capit. closely imbricate, many-flowered. Maritime; growing by the sea-side at the Northern base of Mauna Kea.

——— (No. 9); near P. colonum. Naturalized in the environs of Honolulu, and in other localities; having been introduced by aboriginal settlers.

Cenchrus (calyculatus; No. 1, bis Metia to the Feejee Islands). Frequent on the low alluvial isthmus on Maui; also, on Oahu, and in other localities; introduced, unintentionally, by aboriginal settlers.

Eleusine Indica, (No. 1, bis Metia to Tongatabu). Regarded by Mr. Minor as an introduced weed, "multiplied within the observation of resident Whites."

Eragrostis capillaris?, compare United States. Spikelets about twelve-flowered. Pathway on the Leeward side of West Maui; introduced, (perhaps from the United States), by colonial Whites.

——— ? (No. 4); or compare Cyperus. A foot high; striate swelling glumes. Frequent in the sands of the low isthmus on Maui.

Digitaria (No. 4; compare Taheiti and the Feejee Islands). Decumbent, and entirely smooth; growing on the new lava-stream.—And apparently the same species around Honolulu, like D. sanguinale, but very small and smooth.

Panicum (No. 4); normal. Environs of the Great Crater, from the elevation of 3000 feet to 5000 on Mauna Roa.

——— nov. sp., (No. 5); near P. capillare. Growing in tufts; the sheaths somewhat hairy. Frequent in the environs of the Great Crater, as far as the elevation of 5000 feet on Mauna Roa.—Apparently the same species, tall with pointed glumes, in the sands of the low isthmus on Maui.

——— (No. 6); perhaps not distinct from the Mauna Roa sp.; but smooth-leaved. Tauai.

——— (No. 7); compare P. capillare. Softly pubescent, and only four to eight inches high. Frequent in the sands of the low isthmus on Maui.

(Gen. near Panicum, No. 1); like a normal Panicum, but the third calyx-glume not found. Leaves short and rigid, with a white cartilaginous margin. Frequent on approaching the Great Crater.

(———?, No. 2); the third calyx-glume not seen. Florets softly pubescent, together with the whole plant; which is multicaul and dichotomously branching, forming singular matted bunches. Maritime; growing on the Southeast coast of Hawaii; and apparently the same species, in the sands of the low isthmus on Maui.

Gen. Panicoid, (No. 1). Habit of Agrostis, multicaul; long hairs on florets. On the flanks of Mauna Roa, at the elevation of 5000 feet; rare.

——— (No. 2); a congener of Mauna Roa sp.; hairy florets. Abounding in the sands of the low isthmus on Maui.

———; the florets hairy, and seeming larger than in the last. Lahaina, on the Leeward side of West Maui.—Perhaps the same species in the mountain-defile across West Maui, the leaves smooth.

Orthopogon; compare (No. 1 Taheiti to the Feejee Islands). Frequent in woods; on the mountains behind Honolulu, in the Puna District on Hawaii, and elsewhere.

Cynodon dactylon, (bis Brazil, Peru, and No. 1 Taheiti to Tongatabu). On the sea-shore of Oahu, and of the other islands. According to colonial Whites, this grass "forms fine lawns."

Eragrostis (No. 1). Three feet or more high; growing in tufts. Occupying tracts,

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Rhapis acicularis, (No. 1, bis Taheiti to the Feejee Islands). Naturalized on Oahu, in the District of Puna, and throughout the Group; in many places abundant, so as to be annoying to the traveller; introduced, unintentionally, by aboriginal settlers.

Bambos (bis Taheiti and No. 1 Samoa to the Feejee Islands); the leaves seeming less rough than in Feejeean. "A brake near Pahuhali, and slender naked stems intermingled, eight or ten feet high and full of fascicles of bulbs?," Brackenridge.

Saccharum officinale, (No. 1, bis Metia to the Feejee Islands). Abundantly cultivated; having been introduced by aboriginal settlers. Other varieties, including some stocks "from Taheiti," afterwards brought here by colonial Whites.

Marsilea (No. 2; compare No. 1 Taheiti to the Feejee Islands). Growing in wet ground, on Oahu and elsewhere; (perhaps indigenous).

sometimes exclusively, in the midst of those of the Heteropogon, on the Leeward portion of the Group.

——— (No. 2); but pointed glumes. Panicle dense, elongate; spikelets 6–8-flowered. In the environs of the Great Crater.

———? (No. 3); apparently distinct; smaller, and the leaves narrower. "District of Puna," Brackenridge.

(Sporobolus, No. 1); compare S. Virginicus. Filling the natural salt-marsh that occupies a portion of the low isthmus on Maui.

(Lepturus?, No. 3); pointed glumes. Abounding on Oahu; and in the environs of Hilo, as far as the elevation of a thousand feet.

Andropogon (No. 3); the spikes often geminate. "Puna," Brackenridge; and between Hilo and the Great Crater, at the elevation of from 2000 to 3000 feet; frequent.

Heteropogon (compare No. 1 Feejee Islands). Abundant; exclusively occupying extensive tracts throughout the Leeward portion of the Group.

Psilotum (bis No. 1 Paumotuan coral-islands to the Feejeean Group). On trunks of trees, and sometimes on the ground; in the environs of the Great Crater; and as far as the elevation of 7000 feet on Mauna Kea.—Apparently the same species, the stems somewhat wider, on the mountains behind Honolulu.

Lycopodium; bis (No. 4) Taheiti (to the Feejee Islands). Habit of L. clavatum; spikes solitary. Pahuhali, and elsewhere; frequent.

——— nov. sp., (No. 11). Habit of L. pendulum and L. clavatum; stems slender, many times branched; scales narrow, subulate; spikes solitary, or sometimes in pairs. Forming large matted tufts on the branches of trees on the mountains behind Honolulu, and in the forest on Mauna Kea, as far as the elevation of 3000 feet; but somewhat rare.

——— nov. sp., (No. 12). Pendulous from the trunks and branches of trees; leaves lanceolate; spikes branching, cylindrical. "District of Puna," Brackenridge.

——— (No. 13). Habit of L. lucidulum; fruit axillary. In the forest on Mauna Kea.

——— nov. sp., (No. 14); like L. lucidulum. Leaves reflexed, serrulate, attenuate at base. On the mountains behind Honolulu, at the elevation of 2200 feet.

(Selaginella, No. 3); like L. hypnoides. Upright; densely branched at summit. In the environs of the Great Crater.

(——— No. 4). Hypnoid; not naked at base, nor so upright as the last. Around a cave at the Falls near Hilo, C. P.

(———? No. 5; recorded as) Lycopodium nov. sp. Rambling on trunks of trees; four inches, upright, branching; lower leaves small, floral leaves enlarged and beautifully ciliate with distant setæ; fruit axillary term. On the mountains behind Honolulu, at the elevation of 2200 feet.

Trichomanes (No. 13); a thick woolly rhizoma. "Frequent between Puna and the Great Crater," Brackenridge.

——— (No. 14). Two to three inches high; a slender rhizoma. "Trunks of trees in the District of Puna," Brackenridge.

——— (No. 15); the largest species. Creeping; the fronds one to two feet high. In the mountain-defile across West Maui.

——— (No. 16). Half an inch high; flabellate. "Waialua, at the Western end of Oahu," Rich and Brackenridge; and on rocks, at the Northern base of Mauna Kea.

——— (No. 17); seeming distinct from T. flabellatum, less flabellate. "Waialua, at the Western end of Oahu," Rich and Brackenridge.

Hymenophyllum (No. 7); hairy. In woods at upper base of Mauna Roa, C. P.

——— (No. 8); a slender rhizoma; fronds smooth, eight to ten inches high, with lax segments. District of "Puna," Brackenridge; growing also on the mountains behind Honolulu, winged and smooth.

——— (No. 9). Not creeping; the tufts eight or ten inches high, pubescent, thick, rigid; segments very narrow, and habit of Trichomanes. "Pahuhali near the new lava-stream, growing on the ground," Brackenridge.

——— (No. 10); seeming more hairy than Hawaiian sp. (No. 7). "On the mountains behind Honolulu," Brackenridge.

——— (No. 11); differing from hairy Hawaiian sp. (No. 7) in frond inclining to become flabellate. "Waialua, at the Western end of Oahu," Rich and Brackenridge.

Dicksonia (No. 13); a congener of N. American sp. Two feet high; frond tripinn., very pubescent, and long hairs. In the Upper portion of the forest on Mauna Kea, and extending beyond the margin; or from the elevation of 6000 feet to that of 7000.

——— (No. 14). Large, tripinn., pubescent; shining hairs on the fronds. Hilo.

Nov. gen. Polypodioid, (No. 1). Frond bipinnatisect, of uniform width throughout and very long, ascending trunks and among branches to the height of sixteen or eighteen feet by means of reflexed segments; remarkable also among Ferns, according to Mr. Brackenridge, for "fruiting while the summit of the frond continues growing, so that sori occur in all stages of development upon a single frond;" the pinn. are serrate, and attached at base. Puna, and elsewhere; frequent.

Gen. Davallioid, (No. 1). Not creeping; frond tripinn., pubescent beneath; the segments serrate; fr. in one-sided cup in axils of segments. "Woods in the District of Puna," Brackenridge.

——— (No. 2). Adiantum-like, and much divided. Frequent on Oahu; and in open ground in the environs of the Great Crater; growing often deep in the steam-vents.

Acrostichum (No. 7); frond thin, broad-lanceolate, thickly penninerved, and the nervures dichotomous. "On trees in the District of Puna," Brackenridge.

——— (No. 8). Eight to twelve inches; stipe long; frond lanceolate, obtuse. "Frequent on trunks of trees in the District of Puna," Brackenridge.

——— (No. 9). Frond two feet high, lanceolate, penninerved, the nervures numerous, and usually forked. Tauai and Puna; growing on the ground in the forest.

——— (No. 10). A rhizoma; fronds lanceolate, smooth, the fertile one with a long stipe. Epidendric on trunks of trees, at the upper margin of the forest on Mauna Kea, at the elevation of 6700 feet.

——— nov. sp., (No. 11). Frond lanceolate, two feet high, the under surface covered with broad paleæ. Tauai.

Schizea nov. sp., (No. 5). Simple, six inches high, growing in tufts. On the mountains behind Honolulu, at the elevation of 2500 feet.

Adiantum (No. 9); like A. capillus-veneris. Small, six to eight inches high; the segments large. Cliffs of the coast at the Northern base of Mauna Kea; also, on Oahu.

Lindsæa? (No. 4); simply pinnate, the segments recurved. In the forest on Mauna Kea, at the elevation of about 4500 feet.

——— nov. sp., (No. 5). A remarkable fern, Nephrodium-like. In the "mountain-defile across West Maui," Brackenridge; rare.

———? (No. 6); a congener of the last, but having the habit of Asplenium trichomanes. "On the mountains West of the gap behind Honolulu, growing on the face of crags, and once only met with," Brackenridge.

——— (No. 7); apparently normal. Frond pinnate; the segments recurved, obtuse. "On the mountains West of the gap behind Honolulu," Brackenridge.—Perhaps the pinnate species, having a rhizoma and epidendric on the trunks and branches of trees.

Marattia (No. 1). Three to five feet high; frond tenderly herbaceous, bipinnate, the segments sub-petioled and serrate. Hawaii, and elsewhere; frequent in the forest. The root farinaceous and esculent; the young fronds also used for food by the natives.

Blechnum Fontanesianum, (No. 3). A small low tree-fern. Abundant throughout the Group; on the North flank of Mauna Haleakala, extending to the elevation of 6700 feet.

——— (No. 4); a congener of the last. Low, and spreading. Growing on a bank in the forest on Mauna Kea, at the elevation of about 4500 feet.

Gleichenia; compare (No. 1) Taheiti (to the Feejee Islands). Frequent at the commencement of the forest, and more or less sub-scandent, among the lower branches of the trees; the midrib of the frond smooth. Northern base of Mauna Kea; also, in the environs of the Great Crater, and elsewhere.

——— (No. 3); rachis paleaceous throughout. Growing in the portion of the forest on Mauna Kea above the elevation of 3000 feet.

———(No. 4); a fine species. Smooth; frond bipinnate, the segments entire. On the mountains behind Honolulu, at the elevation of from 1500 to 2000 feet.

(Cheilanthoid?, No. 3); like a narrow multifid Asplenium, but fr. marginal, along the superior incurved margin. On the barren Leeward slope of the Tauai table-land.

Ophioglossum pendulum; compare (No. 1) Taheiti to the Feejee Islands. Epidendric. Frequent throughout the Group; the fronds used for food by the natives.

Adenophorus (No. 1). Frond large, eight to twelve inches high, bipinn. and lobed; gold-colored dots becoming visible under the microscope. "Pahuhali," near the new lava-stream, Brackenridge.

——— (No. 2); the smallest species. "Between the Great Crater and Puna," Brackenridge; and the same, the frond not more than a fourth of an inch wide, found "on Hawaii" by Mr. Rich.

——— (No. 3); perhaps distinct; the frond broad, and much divided, the segments more capillary. Tauai.

Polypodium (No. 12). Small, three to four inches high; frond stipitate, lanceolate, hairy; fructification in two rows. "Between the Great Crater and Puna, growing on trunks of trees," Brackenridge.—Apparently the same species, with narrower longer leaves and fewer hairs, on the mountains behind Honolulu.

——— nov. sp., (No. 13); linear, Vittaria-like or grass-like fronds. "Frequent on trunks of trees, between the Great Crater and Puna," Brackenridge.

——— (No. 14); like the last, but serrate, and sometimes forked; fr. small, and where begins the denticles disappear. "Between the Great Crater and Puna," Brackenridge.

——— (No. 15); different from serrat. Frond small, linear, pinnatilobed; fr on each lobe. On the mountains behind Honolulu.

——— (No. 16); much like P. vulgare, but wider fronds and a rhizoma; pinnis crenate. On trunks of trees in the environs of the Great Crater.

——— (No. 17). Epidendric "on the trunks of trees," but no rhizoma; frond delicate, four inches to a foot high, and simply pinnatifid. "Puna," Brackenridge.—Perhaps the small pinnate species which grows on trunks on the mountains behind Honolulu.

——— nov. sp., (No. 18). Frond pinnate, devoid of black midrib; the segments puberulous, serrulate, and more horizontal. On trunks of trees, on the mountains behind Honolulu.

———? (No. 19); paleæ all over; fr. as in small pinnate sp.; but frond three feet high, tripinn., and the segments large, broad, and dentate. "On the mountains West of the gap behind Honolulu," Brackenridge.

———? (No. 20); same habit as the last. Three to four feet high; frond bipinn.; fr. on the margin, so that visible on both sides of the frond; segments serrate, incurved. "On the mountains West of the gap behind Honolulu," Brackenridge.

———? nov. sp., (No. 21). Delicate, tender, eight to ten inches high; frond bipinn., the segments broad; handsome fructification. Found by Mr. Rich "on Hawaii," probably on the Western side of Mauna Roa.

———? (No. 22). Frond large, three to four feet high, bipinn.; the segments broad, and dentate; sori few. On the mountains behind Honolulu; rare.

———? (No. 23); seeming distinct from Oahu sp., and more hairy stipe and upper side of the rachis. Habit of Thelypteris, but no indusium; frond pinn., the pinn. serrate. Two and a half miles from the Great Crater, towards Mauna Roa.

Doodia Kunthiana, Gaud. (No. 2; compare No. 1 Feejee Islands). On the mountains behind Honolulu.

Cyathea (No. 5). A tree-fern; the trunk six feet or more high. On the mountains behind Honolulu, at the elevation of fifteen hundred feet; by no means rare.

Vittaria; compare (No. 1) Taheiti (to the Feejee Islands). Puna, and elsewhere; frequent.

Pteris; compare (No. 1 Taheiti to the Feejee Islands, and) P. aquilina; under surface tomentose. Tauai, Hawaii, and on the mountains behind Honolulu.

———; compare (No. 10) Feejee Islands. Frond pinnate, the lower segments ternate. Tauai.

——— (No. 13). Three to five feet high; stipe white, and smooth; frond bipinn., the pinn. entire, somewhat incurved. Tauai; Puna; and apparently the same species, on Mauna Kea.

——— (No. 14); near P. alata, but not alate. On the Mauna Kaala ridge; and at the upper margin of the forest on Mauna Kea.

——— (No. 15); segments wider than in the P. pedata of Puna. Oahu.

Thelypteris (No. 8). Large; frond pinnate, the pinn. dentate. Pahuhali, and elsewhere; frequent.

———? (No. 9); bipinn., and the pinn. deeply incised. Banks of stream, in the upper portion of the forest on Mauna Kea, at the elevation of about 4500 feet.

——— (No. 10); frond pinnate, the pinn. dentate; sori near the margin. Frequent in wet ground; in the valley behind Honolulu, and also around Hilo.

——— (No. 11); fr. along the margin. On the mountains behind Honolulu.

Nephrodium (compare No. 1 Metia to the Feejee Islands); near N. exaltatum; three to five feet high, and entirely smooth. Abounding in the lower portion of the forest on Mauna Kea.—The same species apparently, having the stipe pubescent above.

———; perhaps distinct, the segments shorter. In the mountain-defile across West Maui.

(———?, No. 4; recorded as) Aspidium nov. sp. Frond pinn., the lobes hastate. Mauna Haleakala, at the elevation of about 5500 feet.

Aspidium (No. 8); lax, frond tripinnate, the pinn. dentate. Between the Great Crater and Mauna Roa; also, on Mauna Kea.

——— (No. 9); near New Zealand sp. Paleaceous, frond bipinn., the segments incurved. In the forest on Mauna Kea, at the elevation of about 4000 feet.

——— (No. 10); frond wide, 4-pinnate, the divisions and subdivisions given off at right angles. In tufts spreading above the ground within the upper margin of the forest on Mauna Kea, and extending into the inferior portion of the pastoral district.

———; compare the last sp. Frond bipinn., the pinn. incurved; stipe and rachis very paleaceous. Bank of stream in the forest on Mauna Kea, at the elevation of 3500 feet.

——— (No. 11); habit of right-angled sp. (No. 10). Frond tripinn.; the stipe and rachis very pubescent. In the forest on Mauna Kea, at the elevation of about five thousand feet.—The Mauna Kea sp. with the stipe hairy, growing also on Mauna Haleakala, at the elevation of 5500 feet.

——— (No. 12); like A. filix-mas. In radiated tufts, like nests, the rachis being exceedingly paleaceous and somewhat rigid. The prevailing fern in the upper portion of the forest on Mauna Kea; also seen near Puna; and again, on the North flank of Mauna Haleakala to the elevation of 7200 feet; and on the Tabular summit of Tauai.

——— (No. 13). Four to six feet high, forming nests; stipe and rachis white and tender, about a third of an inch in diameter, and with long paleæ; frond tripinn. In the forest on Mauna Kea, at the elevation of from 3000 to 4500 feet.

——— (No. 14); a fine species. Three to five feet high; frond large, bipinn.; paleæ all along the midrib; fr. large, along the margin. On the mountains behind Honolulu.

——— nov. sp., (No. 15). Habit of P. hexagonopterum; broad frond, two feet; the lower segments tripinn. and lobed. Oahu.

———? nov. sp., (No. 16). Four feet high; frond narrow, 4-pinnatisect; covered with broad chaffs to end; sori minute. "North flank of Mauna Kaala," Rich and Brackenridge.

Diplazia? (No. 11); frond large, and tender. Mauna Haleakala, at the elevation of about 4000 feet; compare the species on Oahu.

Gen. near Asplen., (No. 1); but apparently no indusium?. Ornamental; three feet high; frond pinnate, with segments at base. In the Upper portion of the forest on Mauna Kea, at the elevation of 4500 feet.

Asplenium nidus?, (compare No. 1 Paumotuan to the Otafuan coral-islands and the Feejeean Group); yet seeming distinct; frond with the margin callous, and the nervures more prominent and conspicuous; compare also Scolopendrioid (No. 1 Feejeean Group). At the "saw-mill near Hilo," Brackenridge.

———; seeming distinct from A. nidus. On the mountains behind Honolulu.

——— (No. 19); like A. ebeneum, but longer recurved segments, incised; thin consistence. "Puna, near Kaivi's residence, growing on the ground in the woods," Brackenridge.

——— (No. 20); like A. ebeneum, but sometimes larger, frond rooting at the apex; pinn. undulate or coarsely crenate. At the saw-mill near Hilo.

——— (No. 21); habit of A. serrat., but bipinn. Three to four feet high; long narrow rigid frond. "On the mountains behind Honolulu," Brackenridge.

——— (No. 22); near A. serra. Segments long-acuminate; sori nearly parallel to the midrib; indusium not made out. Frequent in woods in the Puna District.

——— (No. 23); like A. serra. Two feet high; pinn. lobed, the lobes serrate; sori heading towards the apex of the nearest lobe. At the commencement of the forest on Mauna Kea, at the saw-mill near Hilo.

——— nov. sp., (No. 24); habit of A. serra. Three feet high, strict; segments longer than in the other species. Tauai.

——— (No. 25); like A. lucidum. Three to four feet high; frond pinnate, the pinn. minutely serrate, long-caudate. "Woods in the District of Puna," Brackenridge.

———? (No. 26); habit of Aspid. asplenioides. Tender and delicate; frond tripinn. and incised; indusium not made out. "Puna," Brackenridge.

——— (No. 27); a second species having the habit of Aspid. asplenioides. Large, four to five feet high; frond bipinn., the pinn. pinnatifid; indusium not made out. Upper portion of the forest on Mauna Kea, where the summits of the fronds were found blighted by frost; growing also at Hilo, and in the District of Puna.

——— (No. 28; a congener? of No. 17 Feejee Islands). Habit of Adenophorus; frond bipinn.; the segments with rounded obtuse lobes, those next the rachis divided. "Puna, growing in tufts on the trunks of trees," Brackenridge.

——— (No. 29); a second species with recurved segments; larger and longer; frond long-caudate. "A graceful plant, frequent in certain situations in the Puna District," Brackenridge.

———; compare parsley-leaved sp.; the stipe seeming more paleaceous; rusty. Between the Great Crater and Mauna Roa.

——— (No. 30); larger than parsley-leaved sp.; sometimes viviparous; frond bipinn.; the segments broader, cuneate, lobulated. "Puna," rather rare, Brackenridge.

——— (No. 31); habit of parsley-leaved sp., but multifid, and the lobes linear. On trunks of trees in the forest on Mauna Kea, at the elevation of 4000 feet; and apparently the same species, larger, with broader segments and several sori, at the saw-mill near Hilo.

——— (No. 32); near parsley-leaved sp.; pendent segments. In the mountain-defile across West Maui.

———? (No. 33); smooth; sori extending close to the midrib. Hilo.

———? (No. 34); parallel sori; stipe more woolly than in Hawaiian sp. (No. 33). "Mountains on the West side of the gap behind Honolulu," Brackenridge.

Pinonia (No. 1). Ten to twenty feet high, and readily mistaken for a tree-fern; but the real stem is very slender, edible, and does not become woody, the main portion of the seeming trunk consisting of impacted fibrils that secure support by enveloping the upright stem of some neighboring woody plant; stipes smooth, but with quantities of long soft gold-colored wool at base; sori marginal. Abounding in the Lower portion of the forest on Mauna Kea; also on the mountains behind Honolulu. The downy wool is collected in quantities, for stuffing pillows and similar economical purposes.

———? (No. 2); basal portion of the stipes rough, and bristly with long blackish hairs; sori larger. In the forest on Mauna Kea.

———? (No. 3); perhaps a third species?. The seeming trunk six feet high by two inches in diameter; under surface of the fronds green; no fructification. In the forest on Mauna Kea, at the elevation of 3500 feet; growing also along the new lava-stream.

Jungermania (No. 5). Between the Great Crater and Mauna Roa.

——— (No. 6); a second species; larger leaves. "Environs of the Great Crater," Brackenridge.

——— (No. 7); a third species. Delicate; leaves very narrow, at right angles. "Pahuhali" near the new lava-stream, Brackenridge.

——— (No. 8). Small, blackish; creeping over white Parmelia. Hilo, C. P.

———? (No. 9). Ornamental; leaves crowded, almost setiform; no flowers. On the mountains behind Honolulu.

——— (No. 10). Very minute. Growing on fronds of Hymenophyllum, on the mountains behind Honolulu.

Marchantia (compare Taheiti and the Feejee Islands); large thin fronds. Growing around a cave at the Falls near Hilo.—This, or the next species, on Mauna Haleakala, at the elevation of 5500 feet.

——— (No. 3); fronds smaller, thicker, smooth, as if scaly; flower-stem hairy. Growing around a cave at the Falls near Hilo, C. P.

Anthoceros (No. 1). Growing around a cave at the Falls near Hilo; and also, beyond the elevation of 3500 feet, in the forest on Mauna Kea.

Gen. Riccioid, (No. 1). Habit of Riccia natans, but "growing on the trunks of trees;" frond dichotomously divided, the segments linear. "Puna," Brackenridge.

Hypnum?; compare (No. 2) Taheiti (to Samoa). Rambling from old branches; no fr. At the Northern base of Mauna Kea; and apparently the same species, ornamental and very long, growing on branches of trees on Mauna Haleakala, at the elevation of about 4000 feet.

——— (No. 6); habit of H. dendroides, but longer and less rigid. In the forest on Mauna Kea, at the elevation of about 3500 feet, C. P.

———? (No. 7); a second plumose species. On the Northern base of Mauna Kea, below the forest.

——— nov. sp., (No. 8). Plumose; very large; stems two inches. At the "saw-mill near Hilo," Brackenridge.

——— (No. 9); or compare Splanchum?. Beautifully plumose; about sixteen fringe-teeth. At the Northern base of Mauna Kea.

Polytrichum (No. 2); the dried leaves curling. Bank near our first encampment in the forest on Mauna Kea, at the elevation of about 3500 feet; rare, not seen elsewhere.

Anyctangioid (No. 2); or compare Gymnostomum. Leaves closely imbricate; fr. large, sessile. On trunks of trees in the forest on Mauna Kea, at the elevation of about 3500 feet.

Fontinalis? (No. 1); compare F. minor. Abounding in a stream at the Northern base of Mauna Kea.

Dicranum (No. 3); leaves linear and wiry. In woods, frequent; Puna.

———? (No. 4); oblong, obtuse? leaves. "Puna," Brackenridge.

Bartramia (No. 1). On the banks of a torrent in the forest on Mauna Kea.

Bryum? (No. 1). Whitish; no fr. Between Hilo and the Great Crater.

——— (No. 2). Short stem; simple; long green subulate leaves; fringe of about twenty teeth. In the forest on Mauna Kea.

———? (No. 3); but very large; about sixteen simple fringe-teeth. In the forest on Mauna Kea.

Sphagnum (No. 1). Rare; found by Mr. Brackenridge at the "saw-mill near Hilo;" (a locality to be suspected, as timber may have been brought there from Oregon).

Orthotrichum (No. 2); calyptra concealed by conspicuous tuft of yellow hairs. "Between the Great Crater and Puna, on rocks and on the trunks and branches of trees, fre-

quent," Brackenridge.—Abounding also on the mountains behind Honolulu; a fine species.

Gen. Orthotrichoid, (No. 1); the calyptra smooth. Investing old branches in the forest on Mauna Kea; frequent.

———; Trichostomoid, but no hairs. On branches of trees, on the mountains behind Honolulu.

(Trichostomum?, No. 2); capsule invested with long hairs; but not the habit of Orthotrichum. Northern base of Mauna Kea.

Gen. Musc., fringe of eight teeth, (No. 1). Leaves lanceolate, acute; fr. terminal; calyptra upright, pubescent. Northern base of Mauna Kea.

Gen. Musc., very small and delicate, (No. 1). Leaves sharp-pointed, almost capillary; fringe of as many as fifteen teeth. "Puna," Brackenridge.

Gen. Musc., branches all in the same plane, (No. 1). Thin concave serrate leaves; small fr. Investing dead branches in the forest on Mauna Kea.

Parmelia? (No. 5). Having a very broad white frond, the under surface black; no shields. Hilo, C. P.

———? (No. 6); yellow dots on margin. Trunks of trees in the forest on Mauna Kea; frequent.

Usnea (compare No. 1 Taheiti to the Feejee Islands); in flower. Between the Great Crater and Mauna Roa.

———? (No. 3); Borrera-like, and yellow. "Branches of trees, on the mountains West of the gap behind Honolulu," Brackenridge.

Sticta? (No. 5); near S. pulmonacea, but the shields marginal, pedicelled. Trunks of trees in the forest on Mauna Kea, at the elevation of 3500 feet.

———? (No. 6). Small, brownish; habit of Parmelia. Trunks of trees in the forest on Mauna Kea.

Gen. Sticta-like, (No. 1). Habit of Parmelia; frond much divided, the under-surface black and smooth; very large shields. Trunks of trees in the Upper portion of the forest on Mauna Kea.

——— (No. 2); a second species. Habit of Parmelia; frond dichotomously divided, the under-surface black and hairy; large shields. Trunks of trees, in the Upper portion of the forest on Mauna Kea and elsewhere; frequent.

Cenomyce (bis No. 2 Feejee Islands); nearly simple; red-tipped. Along the route of the new lava-stream; also, at the Northern base of Mauna Kea, and elsewhere; rather frequent.

——— (No. 3); branching, two inches high; brown heads. In the forest on Mauna Kea.

Ramalina? (No. 2); large and fine. On the Southern flank of Mauna Kaala.

Gen. Ramalinoid, (No. 1). White, dense, coralline-like, brittle; one half to three-fourths of an inch high. Branches of trees, at the upper margin of the forest on Mauna Kea.

Lepraria? (No. 1). An investing yellow powder; like our New England sp., but sometimes whitish; no fr. Lower margin of the forest on Mauna Kea.

Alectoria? (No. 1); giving out black hairs. Trunks of trees in the Upper portion of the forest on Mauna Kea, frequent.

Agaricus, (No. 7); hirsute. Growing on trunks of trees, in the environs of the Great Crater. The same species, at the upper margin of the forest on Mauna Kea, at the elevation of 6700 feet, bristly, growing on the trunks of trees.

Lycoperdon (No. 4); a species met with.

Gen. Fung., (No. 1); outwardly resembling a Lycoperdon, but a layer of egg-like bodies under the slightly papillose skin. On the mountain-ridge behind Honolulu.

Gen. Tremelloid; bis Taheiti (perhaps No. 1 Samoa); large and brown. Growing on dead trunks in the forest on Mauna Kea.

THE LAVA-COVERED PORTION OF HAWAII. Hawaii is mainly buried under lava-streams; these have descended at different times from the summit of Mauna Roa, filled the inequalities of the natural surface, and flowed over into the sea; except only, that in one direction Mauna Kea has fenced off the flood. We emerged from the Mauna Kea forest upon the outermost overflowing lava-stream from the valley between the two mountains; and in continuation of this margin downwards, the lava-streams cease to encroach upon the sea at Hilo: the harbor at Hilo is thus the work of a crater more than fifty miles distant; and the projecting summit and Windward flank of Mauna Kea retain their original surface.

The remaining much more extensive portion of the island has long been covered over with an additional surface-layer of a peculiar character. The plants, in their generations, survive; but have been forced into secondary adaptations, in a new soil, under new local influences. A clearer idea of the normal Hawaiian vegetable growth may perhaps be gained by omitting the exceptional district; yet the observations made therein have seemed worthy of record.

In the view of the island from the harbor at Hilo, the forest was observed to continue over the lava-covered district at about the same distance from the coast, leaving the wide space in front almost as unwooded as farther West. This lava-covered space was clouded with darker patches, from the frequency of the dwarf tree-fern, *Blechnum Fontanesianum;* while intervening tracts seemed filled with showy yellow flowers; these proved to be the falling leaves of a species of *Rhus*; an instance of brilliant-tinted deciduous foliage even within the Tropics, and in the entire absence of frosts. Hilo is noted for its rains; which are so frequent and copious, as to have caused the port to be avoided by whale-ships. Back of Hilo on the rising ground, the soil in the little depressions of the lava-surface was observed to be very generally marshy; as appeared also by the character of the plants; a *Thelypteris* abounding, together with *Hibiscus Youngianus*, the *Lythrum*, *gen. Davallioid*, and an *Eleocharis*. This district proved moister than any other portion of the island; yet the lava maintained its usual porous

character, and there was little or no overflowing of the depressions in rills of running water.

Immediately after our arrival, arrangements were made for the ascent of Mauna Roa; and a large party having been formed, I set out with others on the 14th of December: the route continuing all the way upon the lava-covered portion of the island. We first proceeded Southward, towards the GREAT CRATER; whose place is recognized on a clear day by the ascending smoke-like vapor, like a heavy overhanging cloud in the distance. At the end of "four miles," we entered the forest; which, in extending over the lava-streams, was already diminished in width to only "two miles;" but after passing the continuous belt, patches of woods were in sight at intervals on either side of our route. We kept on, regularly though almost imperceptibly ascending; and with the coming on of night, the distant crater in front illumined our path. The light diffused around by the Great Crater is neither direct, nor in general reflected, coming from the bottom of a pit a thousand feet deep; yet is at times so great, that "persons have read by it at Hilo, thirty miles distant." The night was far advanced when I reached the half-way house, in company with some of the foremost of our party.

On the morning of the 15th, I proceeded in advance; ascending, hardly perceptibly, over the same sort of open country as on the previous evening; over a lava-surface rising in little prominences; the intervening soil-covered depressions clothed with herbage, and in some instances containing a diminutive pool of water, and marshy ground filled with the small *Rhynchospora*. Throughout this wide-extending extremely gradual slope, say from the elevation of 2000 feet to that of 4000, low bushes of a *Vaccinium* and *gen. Epacrid.* were growing in the soil-covered inequalities and in clefts, together with the *Hamelinia* everywhere conspicuous; and among other frequent plants, three species of an Iris-leaved *gen. Restioid;* the dwarf tree-fern, *Blechnum Fontanesianum;* the *Lythrum;* a *Plantago*, somewhat resembling P. lanceolata; a *Kadua*, taking the place of our Northern Gentians; a *Scævola;* a *Stevia?*, at least agreeing in aspect; a normal *Panicum;* a Hypnoid *Lycopodium;* and a *Polypodium* resembling P. vulgare. On the right, the patches of woods seemed to form an irregular but continuous forest; screening from view the basal portion both of Mauna Kea and Mauna Roa.

In the middle of the afternoon, I came upon a crevice, where the

country beyond had sunk down several feet; the whole foundation being insecure. With at first some misgivings as to setting foot upon the falling district, I proceeded; and soon remarked steam rising in quantities at different points in sight. The path led by degrees towards one of these steam-vents; which I passed, and just beyond, found myself unawares on the brink of the enormous pit, the Great Crater. The vastness of its proportions being a matter of calculation and measurement, I found it impossible to realize the extent of area, and was disappointed. From the portion of the brink on which I was standing, the lake of molten rock was about two miles distant; the surface in the broad daylight chiefly dark-colored, with the marginal fountain-jets looking like the flickering flame of burning brush. On a subsequent occasion, the jets at the distance of a fourth of a mile through the smoke-like exhalation, agreed better with the usual descriptions, and really bore some resemblance to "spouts of blood."

Notwithstanding the large amount of molten rock, in a lake "nine hundred feet" long with an area of "twelve acres," the temperature on the brink of the Great Crater is not sensibly affected, and provision must be made against suffering from cold at night; the surrounding country seems a plain, but the elevation is not less than "four thousand feet." Immediately around the Great Crater, gravelly soil prevails, much of it remaining bare; the plants met with on the way, partly giving place to certain humble shrubs, a few inches only in height: as a peculiar *Vaccinium*, loaded with berries of different colors, red and whitish; a willow-leaved *Daphne*, rather frequent, with berries closely resembling those of the intermingled orange-fruited *Coffeac.?*; and more abundant here than elsewhere, the *gen. Coffeac.* with black berries and almost Epacris-like foliage, from its profusion and its recurved spreading branches, often forming beds. In the extensive gravelly almost Desert tract on the South side of the Great Crater, a *Gen. Silenoid*, a shrub with Ericoid foliage, was subsequently found to be the principal plant.

At the Northern brink of the Great Crater, the supply of water is sufficient for the use of visitors; being distilled without the aid of art, and derived exclusively from steam: this is condensed partly on the foliage of living plants around, the falling drops collecting in little cavities in the rock, that after being emptied are soon replenished. One or more tufts of an Iris-leaved *Restioid* were usually present, overhanging the steam-vents; or sometimes the condensation was on

the leaves of the *Hamelinia*. On closer examination, the very presence of plants seemed often due to the moisture of the steam-vents. I was struck with the novel combination of the elements forming climate; but after diligent search in the clefts, and wherever the plants were exposed to superior warmth and moisture, I could detect no change in species, nor even in the habit of growth. The *steam-vents* were found to be holes descending irregularly into the somewhat concentric crevices, formed in the settling down of the country towards the Great Crater, through undermining within, at the bottom. The lava-surface being very porous, the steam arose from intercepted subterraneous springs, fed entirely by the rains; for we ascertained, that steam is emitted from the bottom of the crater only after falls of rain; which are here rare and very slight.

I remarked on the ground and on the vegetable growth, single threads crossing each other horizontally, and entirely resembling spider-webs, except in the unaccountable fashion of spinning. They proved to be threads of *capillary obsidian* or volcanic glass; of the variety which seems peculiar to this crater, passing in cabinets under the name of "Peli's hair." These seeming cobwebs are extremely light, and during a slight shift of wind which I once witnessed here, came floating over in tufts somewhat resembling tow. In general, the threads are not seen falling, but lying singly on the surface of the Leeward portion of the island; and even high up Mauna Roa, more than twenty miles from their place of origin.

The Great Crater, like the two other lava-fountains of the Hawaiian Group, is situated in the curve or angle of a distinct crevice of formation; as though, in first bursting forth, the molten rock had lifted a scale-like portion of the Earth's crust. The crevice of formation extends across the whole island from sea to sea; and to the present day serves as the crevice of eruption, through which the lava takes one of two directions in the emptyings of the crater. The Great Crater does not fill up and overflow; but when about half full, walls of rock are no longer strong enough to hold the accumulated liquid mass; the island itself seems to split open to give it egress. During the discharge, the central portion of the mass within the crater is drawn off; leaving the remainder adhering to the sides in a wide shelf or terrace, continuous all around, and called by residents the "black ledge." This terrace has a lake-like surface, congealed and black; depressed below the brink, according to our measurements, about "five hundred feet;" the

central pit having "four hundred feet" of additional depth, being nearly at its lowest level on account of a recent emptying.

On the 16th, I descended with others into the Great Crater, by the usual path. On reaching the "black ledge," the lava-surface although level was found to be by no means even; the inequalities, a yard or more high, instead of resembling waves, being more like overlapping furrows, from the lifted edges of half-congealed floes, and the piling of superficial currents; for in cooling, the lava passes slowly through the semifluid state, continuing for a space to flow onwards; and ending in a configuration of surface very unlike that of congealed water.

Most of the lava of the "black ledge" was coated with a vitreous, brittle, and scoriaceous crust, half an inch or so deep and easily detached; which gives way and is crushed under the weight of the traveller. While recent, this crust is black and shining, often of a pseudo-fibrous texture that might be mistaken for crystalline: but after years of exposure on lava-streams, the crust loses its lustre, turns gray, and at length decomposes and disappears. In accumulations of layers, whether on the "black ledge" or elsewhere, I have found the crust only on the surface of the uppermost layer. Cabinet specimens of this crust sometimes pass for lava; whereas, the rock underneath is the real lava, and is as heavy, solid, and enduring as granite or any other kind of rock. I was almost startled by its resemblance to much of the rock of ocean islands, both in the Atlantic and Pacific: the contained cells being often irregular in shape, very thinly scattered, or for considerable spaces wanting; leaving hardly any marked distinction from basalt.

All over the surface of the island, the lava proved very uniformly of the crusted kind: but on the "black ledge," currents were met with of another kind of lava, smoothish externally and hard and solid throughout; yet withal somewhat vitreous, fragments having scaled off from rapid cooling, as in the instance of imperfectly-annealed glass. This variety of lava contained large ampullæ, or swellings that proved to be hollow, with the lower surface somewhat re-entering, like the bottom of a bottle; formed apparently by gaseous matter, and in larger quantities than I was ever able to detect in watching volcanic action.

Proceeding Westward over the "black ledge;" after making one-fourth of its circuit, we arrived at a place where, during the recent emptying, a lump of several acres had fallen into the central pit; the original surface remaining intact, and inclining downwards in a gradual

slope, so as to afford access to the bottom. The descent was not free from difficulties; and on reaching the bottom that from above appeared even, we had to toil up-hill and down-dale, across fissures, and over elevations thirty feet or more high; until, at the end of three-fourths of a mile, all the way sensibly descending, we were stopped by finding the lava-surface so heated that we could proceed no farther. Various devices for overcoming the difficulty were in vain resorted to; the margin of the Great molten lake being in sight, and not more than four hundred yards distant. Our guide, John Ely, consoled us by saying, "There is no safety in the bottom of the crater, not for a single instant; the fire will sometimes run over eight or ten acres in two minutes:" it soon became manifest, that the Great molten lake does not keep its level; but at irregular intervals rises and in all directions overflows its banks, adding to the accumulation, and again sinking down. The lava that stopped our progress, was poured out in the overflow we witnessed the preceding night.

Retracing our steps, we observed a gently-rising eminence to the Westward; and ascending, found ourselves at the margin of the *Smaller molten lake.* Most of its surface was congealed; but the central portion was red and slightly in action; the lava leaping in a liquid dome-like mass as high as six or eight feet, while minor spouts were ejected to a much greater height. At the distance of not more than fifty feet, I watched the spouts narrowly: there was no escape of steam, there being no visible condensation, and no signs of the bursting forth of gaseous matter; the fitful uneasy motions of the huge molten mass were not due to such feeble agents. From its surface, a thin smoke-like vapor was everywhere slowly rising, very uniform in density throughout, yet not seriously obstructing the view. On one side, it seemed possible to proceed over the congealed surface of the lake to the fluid portion: but while we were looking, the fluid portion began slowly to enlarge, gaining steadily by a gradual and regular process; a crack would make its appearance at the distance of several feet in the congealed surface, showing a red gleam of light from below; some fluid lava would presently ooze forth, when the floe would begin to detach itself, sinking at the other end, or seeming to be hurried obliquely downwards under the molten mass. In this manner floe after floe was hurried out of sight, until the fluid portion gained the bank all around; when, by the advice of our guide, we withdrew. For this lake overflows its banks in the same manner as the large

lake; and not synchronously, its action seeming altogether independent.

On referring to our watches, we were astonished at the time that had elapsed since we set out in the morning; the descent into the crater, to the point in the bottom of the pit where we turned back, proving a two-hours walk. Notwithstanding measurements, we could not realize the dimensions of the Great Crater; shown to be capacious enough to hold and conceal any city of Europe or America; Paris and London only excepted.

On our way back, we obtained a view down a crevice; and discovered, that after a few feet, the rock was everywhere heated to redness. In smaller and more shallow crevices, the ends of sticks would sometimes take fire a few inches only beneath the surface on which we were standing; and the same result was obtained in certain crevices of the "black ledge" above. The whole bottom of the crater was evidently at no great depth heated to redness; and the subterranean glow may not be confined within the walls.

Having ascended out of the central pit, I parted from my companions, and turned Southward, to make the circuit upon the "black ledge." I met with places where the "black ledge" had caved in to the depth of a hundred feet or more; being, as was now evident, not solid throughout, but sustained in part by a sort of dome-work of natural masonry; the lava here further resembling basalt, from having separated in cooling into blocks more or less hexagonal. I went out upon the promontory which contracts the outline of the central pit, and approaches nearest to the Great molten lake below. The cliff was cracked and tottering, with much heat rising through the cracks; the noise of the moving mass in the molten lake being plainly audible; as it is sometimes even above, on the neighboring portion of the brink of the crater. By a rare exception, there was some local disturbance at the Southern margin of the lake; where at one spot, the lava was spattering and thrashing against the bank. Continuing my walk, I remarked a bluish smoke accompanied with invisible sulphur fumes issuing here and there from small fissures; with little accumulations around of efflorescences, those of *sulphur* being rarely pure. On the Southwest portion of the "black ledge," some places proved difficult to get over, on account of the abundance of these sulphur fumes. In the above accumulations of sulphur dust, a *tasteless white* powder was often intermixed, sometimes by itself lining little cavities, and even becoming

plumose. A much more rare powdery efflorescence was also *white*, but had a sharp taste, too sharp it appeared to me for alum. In the lava itself, *chrysolite* was the only imbedded mineral met with; *iron* may have been diffused generally, but there were no traces distinguishable: a minute quantity of a bluish ore "from the bottom of the crater" was afterwards shown me, supposed to be *copper?*. I kept on as far as a singular altar-like excrescence, six feet or so high, composed of a very brittle kind of rock, curled in all sorts of fantastic shapes, opaque and white, and more resembling lime than lava: but lime and carbonates of all kinds are probably absent both from the crater and surrounding country. Returning to the central pit, I took a view of the molten lake from the Southeast; and then proceeded to the Southern wall of the crater, near the point where it begins to be sloping and accessible.

There are here some regular "fumaroles," with steam escaping in large quantities from the basal portion of the vertical wall. Notwithstanding the universal dry efflorescences of the bottom of the crater, water of crystallization is not wanting there, as appeared from the imbedded crystals of chrysolite; but in the "fumaroles," the sulphur was all crystallized. The cavities from which the steam issued, were many of them beautifully lined with sulphur snow, or flocculent crystals; and specimens were procured at some risk of scalding, but on the slightest shock, the whole became a confused mass. There are other "fumaroles" or "sulphur banks" back of our encampment on the plain above; and these yield solid crystals of sulphur.

I next ascended out of the crater by the slope adjoining; passing over various patches of white incrustations with impure sulphur intermixed. The plain above, on this side also, contained concentric crevices formed by the general settling; with steam in a few places issuing forth. Continuing around Eastward, and by degrees Northward, I descended upon the ridge of land separating on the right an extensive pit-crater called Kilauwea: at the end of this Isthmus, I reascended, and soon reached the encampment.

On the 17th, in company with Lieut. S. Elliot, I descended into the Great Crater by the usual path: leading down the only portion of the wall and whole interior that is clothed with vegetable growth. The plants here extend downwards in a scattered manner all the way to the "black ledge:" but even at the junction, there were no marks of scorching on the shrubs, no indications of recent exposure to molten lava, nor of rising in the surface-level of the "black ledge." Neither,

on the other hand, were there marks anywhere along the junction of a depression of the surface-level. Entering upon the "black ledge," we proceeded to a fissure in the Eastern wall, recognized in the distance by a congealed lava-cascade; the stream that issued from it in A. D. 1832.

The "black ledge" is subject to at least partial fusion and renewal. Rev. Mr. Coan "during the last five years had been repeatedly at the Great Crater. The sides remained unchanged, except by the falling of some slight avalanches. Formerly, the volcanic action was more regular and sluggish, less uneasy than of late: the pit in the centre was much as it is now, but larger, leaving the 'black ledge' narrower. Just previous to the recent Eruption in May, the lava had risen gradually and accumulated, so that the centre was in fact much higher than the 'black ledge:' the surface was very uneven, with hillocks, and there were various small lakes, some of them upon the 'black ledge' itself: the large lake still maintained its existence, but had very elevated banks. A few days before the Eruption, according to the testimony of natives, the whole interior mass was in a state of fusion:" and Mr. Coan expressed himself as "confident, that every particle of matter within the Great Crater had undergone fusion within the year." In confirmation of this opinion, I found the margin of the "black ledge" singularly free from fallen debris; even where the sides of the crater, being neither perpendicular nor very sloping, are subject to the above-mentioned slight avalanches. On the other hand, imbedded debris were also absent; the material of the wall, accumulated lava-streams, being perhaps too homogeneous to form conglomerates.

The question of the total fusing of the "black ledge" had not engaged my attention, when crossing the place where the lava-stream of 1832 flowed backwards into the crater. I certainly did not remark any breaking-off by melting, where the stream had entered upon and flowed over the surface of the "black ledge:" but the spot deserves more careful examination, and may be commended to future observers as a chronological landmark.

Turning away, we next proceeded to the central pit; and looking down upon the molten lake from the Northeast, remained for some time watching. A change had taken place during the night, in the formation of a third lake at a little distance from the large one, separated from it by an isthmus, and much resembling a diminutive crater; its banks being higher than those of the large lake, from the

accumulation of fragments spattered over. The large lake was now overflowing in two or three places; the pouring lava moving onwards regularly but very slowly.

Continuing Southward as far as yesterday's route, to complete the circuit of the "black ledge;" we next ascended the slope to the plain above, and turned Westward; but a wall-like cliff compelled us to recede nearly a mile from the Great Crater, before the ascent became practicable. After ascending a second low cliff or ledge, we came upon the Southwestern portion of the great Crevice of formation and eruption: traceable by parallel gaping fissures; and marked in the distance by columns of rising steam, extending in a line for many miles towards the sea.

These fissures are filled at intervals with gravel and sand from the surrounding plain, blown in by the winds; the accumulations, where rising to the surface, affording a passage across. After becoming familiar with these crossing-places, I was about stepping on one; but by a sudden effort recovered my foothold, for my staff penetrated the ground. On further examination, the staff passed its whole length downwards without obstruction; and it was now perceived, that in place of sand and gravel, the crevice was here filled with *pumice;* we were obliged therefore to seek another crossing-place. The tract covered with pumice commences along these fissures; and for the next mile we found the layer of bits of pumice from three inches to a foot deep. On another occasion, in passing around at the distance of two miles from the Great Crater, I first fell in with bits of pumice, when the smoke-like vapor from the lake bore North-northwest; but the bits were thinly scattered, and continued rare until I reached the Crevice of formation and eruption. It was thus ascertained, that the tract of pumice lies immediately under the cloud of smoke-like vapor; which, from the constant direction of the wind, is always moving in one direction. The pumice of the Great Crater resembles bits of dry sponge, and seemed of a lighter kind than that usually found in cabinets: in securing specimens, it is necessary to guard against their being blown away by the wind; and in fact, the layer on the plain seemed to be chiefly kept down by the mixture of sand and gravel. Once, while looking down at night upon the molten lake, two or three small fiery masses were ejected from the illuminated lines between the seeming floes; masses light enough to be afterwards whirled about by the wind: I supposed, at the time, that this might

be pumice; wafted into the air somewhat in the manner of froth; but I had no opportunity of verifying this conjecture.

I have already spoken of single fibres of the *capillary obsidian* conveyed over great distances by the wind. This substance occurs in tufts and quantities only beneath the cloud of smoke-like vapor; on an area extending beyond the limits of the pumice-tract; collecting and filling the inequalities and shallow depressions of the barren lava-plain. On taking up a tuft, the threads were found to vary in fineness; the coarser ones remaining straight, but the finer ones crimped like fine wool, and often terminating in a diminutive drop or globule of glass. Their origin has been traced to the vitreous lava-crust, drawn out in fibres in the liftings and overturnings of the flowing lava, when cooling in furrows that resemble those made by a plough. Small quantities of the fibres are procured underneath such projecting layers of lava; a situation from which, they could hardly be wafted out of the Crater: I was therefore led to suspect, that the molten lake and its spouts might prove an additional source; but no direct confirmation could be detected, even on my nearest approach. Mr. Drayton met with capillary obsidian "in the furrows of the lava of the recent Eruption, as far as the place where it entered the sea:" on the other hand, I looked in vain for this substance in the lava of the terminal crater of Mauna Roa.

It was not quite sunset when we passed the portion of the brink nearest to the molten lake beneath; whose surface was already distinctly illuminated. In company with others, I revisited this spot later in the evening; and looked down upon a spectacle, unique, probably, upon this planet. From the great amount of light emitted the first feeling of surprise was, that only a small portion of the lake should be luminous. We were looking down upon a circumscribed space, which I could only compare to an immense slab of black marble veined with a network of lightning: but there were no sharp angles in the lines of light, which remained permanent, and did not pain the eye; in intensity therefore, hardly exceeding the light of a glass-furnace. The network, though always present, was always moving; and in one direction, regularly and slowly to the Southwest; the meshes enlarging on the way, for they were not solid floes, and coming as sharply against the bank, as though passing underneath. The spouts at the farther end of the lake were altogether luminous, constituting the most brilliant feature in the display; the resulting

accumulation and difference in level seeming to account for the constant direction of the surface-movement.

Only in a few instances, did one or more of the seeming floes lose its opacity, far enough to exhibit a glow of dull red. The surrounding lava of the afternoon overflow had cooled, and did not emit a particle of light: while we were looking, a considerable addition was made to the lake, by the falling in of a portion of the Western bank. We remained an hour or more, the Second lake all the while seeming unusually active; the projecting corner of a mass of fallen lava-cliff occupying the centre, as at the time of yesterday's visit; a fragment too bulky to be easily melted away.

On the 18th, our whole party proceeded along the route up Mauna Roa. A week afterwards, a very extensive overflow from the molten lake covered one-half of the bottom of the central pit; witnessed by Messrs. Brinsmade, Drayton, and Brackenridge.

My SECOND VISIT TO THE GREAT CRATER was made in returning down Mauna Roa. While yet on the flank of the mountain, a heavy cloud of what looked like blackish smoke rose rather suddenly out of the distant Crater. One or two similar puffs had taken place during the first night I passed on the brink; on its most remote portion; and were unattended with any perceptible change in the surface of the molten lake.

Continuing down the mountain, I reached the Great Crater a little before sunset on the 31st; and in the evening, made another visit to the portion of the brink overlooking the molten lake. The mass of rising vapor seemed more dense than before; and the lake was more deeply sunk below the banks, with its surface less brilliant; owing doubtless in part, to there being a vertical moon; but there was clearly less action. The Second lake was entirely inactive, showing only a single steady luminous spark; the pointed mass of black lava maintaining its position, as before; and a similar mass was now projecting out of the large lake near its margin. Two other portions of the bottom of the central pit had become luminous; one of the spots being somewhat extensive, and apparently in the position where a spark had been formerly remarked.

On the 1st of January, 1841, I continued along the main route of travel; the path following the brink as far as the isthmus separating the enormous pit-crater, by the natives called "Kilauwea." It is also called the "Old Crater," and is nearly circular in outline, and hardly

less than a thousand feet deep; seeming deeper than the neighboring real crater, perhaps in consequence of its inferior area. The Isthmus between the two rises to within about two hundred feet of the plain above, and has a flat-topped almost level summit, at the narrowest place half a mile or so in width. On this summit, notwithstanding the elevation above the "black ledge," there is a congealed lava-stream; derived from the ERUPTION OF 1832, which commenced by splitting this Isthmus. The fluid lava squeezed upwards out of the crevice, flowed afterwards mainly Eastward into the pit-crater; filling the bottom with the lake that imparts the deceptive semblance of a seat of volcanic action. A minor portion of the squeezed-up lava flowed back into the crater from which it originated; and in this direction, refluent lava had issued out of the crevice all the way down to the "black ledge," as already intimated. Excepting this manifestation, the Eruption of 1832 was a "silent discharge;" the vast mass of fluid lava passing off somewhere under the ground and under the sea. On arriving immediately afterwards, Rev. Mr. Green and Rev. Mr. Dibble found that the Great "Crater had emptied itself completely, and the fire was nearly all out: the whole upper bank to the Northward had settled down about eighteen inches, and new crevices had opened."

Turning away from the Great Crater, I proceeded to the half-way house; and on the 2d, reached Hilo: the entire distance proving a walk of ten hours, descending all the way.

On the 8th, Mr. Brackenridge and myself set out on the ascent of Mauna Kea: from which excursion we returned on the 19th.

THE NEW LAVA OF THE ERUPTION IN MAY. On the 20th, in company with John Ely and two native guides, I proceeded from Hilo Eastward; over the ancient lava-streams, that after encroaching on the sea, had been broken off in a continuously vertical cliff, twelve to twenty feet high along this whole portion of the coast. At two or three points widely apart, the sea proved accessible; together with a spring of fresh-water gushing out at the tide-level, like those on Savaii in the Samoan Group. The lava-surface on which we were travelling was more or less uneven and rough; with, by an exception, slight patches of woods, in the close vicinity of the sea. The *Pandanus* was especially abundant, of itself forming more or less distinct groves; with *Convolvuli* ascending, and the undergrowth often tangled with *Gleichenia;* but the *Metrosideros* was the principal tree; and another mountain plant was in one instance met with, an *Epacrideous* shrub.

We stopped for the night at the houses of some natives, about two miles beyond Kiau.

On the 21st, we continued Eastward upon the sea-cliff; and at noon, arrived at the canoe-house; Nanavali beyond having been overwhelmed by the new lava as it entered the sea. On approaching the enormous blackened pile of rock, the first thought was, of the easy process that had laid it upon the top of the country; all within the space of a few hours. Towards the sea, a considerable amount of territory had been added to the island; with a sand-beach lining the shore, where sand was previously unknown. Having been accustomed to look upon sand and gravel as a sedimentary deposit, I was unprepared for their production on this grand scale; by the mere pouring of molten rock into the sea. Here was "dry land" formed anew, gravel, sand, fragmentary blocks or stones, and solid rock, with fine earth soon to follow. It was almost like witnessing creation's dawn; and the cooling of the globe itself from a similar molten state.

Before the fire was out, practical man knew what to do: and we found crops of sweet-potatoes already in an advanced and flourishing condition. Other plants had spontaneously fastened upon the recently "liquid fire," as *Digitaria*, and some *Convolvuli:* the *Pandanus* trees outside of the margin standing scorched and dead as far back as a hundred yards; and the living ones beyond loaded with sand, to the distance of two miles from the seat of the sand-storm at the sea-margin. The new lava-cliff entirely resembled the old one adjoining: and with the disappearance of freshness from the blackened surface, will become hardly distinguishable from the ancient lava-streams around, from the ordinary lava-covered portion of the island.

The new lava had entered the sea in a stream more than a mile wide: and about midway, were three conspicuous sand-hills, close to the edge of the lava-cliff; their outer portion deficient, as though by sliding into the water. They consisted of impure and mixed sand and gravel, and fragmentary lava, accumulated to the height of a hundred feet or more, and altogether resembled some of the hillocks on the upper portion of Mauna Kea: in further conformity, the material of these sand-hills, according to the testimony of eye-witnesses, was thrown upwards and outwards from the centre of the heap. Ascending the highest, I obtained a fine view of the desolated landscape in the track of the new lava-stream.

On the 22d, leaving the coast, we proceeded inland along the

Western margin of the new lava-stream. Here and there, its surface had broken up in cooling into beds of "climpers;" entirely resembling those of the old lava on Mauna Roa, except that the fragments were yet more jagged, and not being as well settled in their places, proved a greater impediment to the traveller. Extinct "fumaroles" occurred at intervals on the new lava; marked by little accumulations of sulphur efflorescence, mixed with a white powder, possibly alum.

Passing Pahuhali in the afternoon, we stopped about three miles beyond, at the houses of some natives. The new lava-stream here did not exceed a fourth of a mile in width. The sweeping away of the forest had been accomplished by flowing quietly around the standing trees, which would burn off even with the surface of the molten lava; the upper portion of the tree would then fall over, scorched and killed, to remain unconsumed on the lava-surface: in some instances even, the *epidendric ferns* on the branches had kept alive, and were now seen sprouting. Towards the margin of the lava-stream, where the heat seemed to have been less prolonged, the trunks of the trees had left casts in the cooled lava; perpendicular holes, ten or twelve feet deep, and some of them two feet in diameter; whose origin might not have been suspected, but for the dead tree-top alongside. In this locality also, trees at the distance of twenty feet outside of the lava-stream, seemed to have been hardly scorched.

On the 23d, we continued South, by the Kaimo path; which, in crossing the track of the new lava-stream, remained uninterrupted; except by a mere fissure, kept from closing by the lava cooling while issuing forth. Throughout a great part of its course, the new lava-stream was subterraneous; and only at intervals, were portions forced to the surface through opening fissures. At the intersecting of the Kaimo path, three of these new lava-patches were in close proximity: the uppermost, two miles of its length being in sight, extended to within a few feet of the path; just across, was the middle lava-patch, only a hundred yards or so in length and breadth; while a fourth of a mile below, in plain sight through the woods, was the commencement of the final outgushing; the molten mass continuing onwards above ground, and pouring into the sea at Nanavali.

On its way to the Kaimo path, the new lava-stream traversed an uninhabited district, represented as difficult of access from the roughness of the lava-surface. Two parties from the Vincennes had already followed different routes through this district: but wherever we made

inquiry, the natives recommended going to the source of the new lava by the way of Kaimo on the sea-side. This being a portion of the island that remained unvisited, I was induced, after trying for a space the surface of the new lava, to yield my assent. There was in fact but a single path before us, and this led, by compass, nearly due South; ascending almost insensibly to the summit of this angle of the island; where a branch path came from the Southwest, the same followed by Captain Wilkes a few days previously. We here found ourselves at the elevation of some two thousand feet; and looked down upon the sea in the Southeast; the declivity in this direction being quite rapid.

At the base, we entered Kaimo, situated on a sea-beach; the only one of the Southeastern coast, and therefore celebrated in Hawaiian song. Beyond the village, we kept on the brink of the lava-cliff; which is loftier than that of the Northeastern coast, and thirty to sixty feet above the sea. Dwellings were very rarely met with; and only at points, where through some slight notch, the sea-margin happened to be accessible. The "lands" we crossed, were named to me in the following succession: "Alapuna, Kupahua, Purunanai, Kaunaroa, Ki, Hauwaria having a bathing-place, Popo," and the remainder not recorded. After about nine miles on the lava-cliff, or a mile beyond Kamomoa, we turned away from the sea; and proceeded part way up the slope to the chief's house, where we stopped for the night; and for the ensuing day, the 24th.

We were now in the extensive district of Panau; having entered upon the very remarkable portion of the island where soil is wanting; the old lava-streams presenting everywhere a clean surface of rock. Cultivation is nevertheless practised; for rain falls, and by the ingenuity of the inhabitants a portion is intercepted before disappearing through the lava-rock. Indigenous plants even were not altogether wanting; but made their appearance singly and at wide intervals, growing out of cracks in the lava-surface. To my surprise, several of the species proved to be mountain plants: and low down near the brink of the sea-side lava-cliff, *Osteomeles, gen. Epacrid.*, and the woolly-leaved *Metrosideros*, were alternating with the plants of the warm Leeward side of the group; with the *Heteropogon*, tufted *Eragrostis*, *Waltheria*, *Sida*, *Euphorbia*, *Daphne*, *Capparis*, *Erythrina monosperma*, and especially the *Cassyta*, which was unusually frequent. At the elevation of only a thousand feet, the *Edwardsia* commenced; and at a not much higher limit, the *Pteris ternifolia?*

On the 25th, we continued the ascent on the hardened surface of the tumbling lava-streams to the plain above; where we recrossed the path followed by Captain Wilkes, and entered the village of Kuyupi, at the end of about five miles since morning. We were now in the district of Puna; and the plants belonging to the vicinity of the Great Crater began to make their appearance. Two miles beyond Kuyupi, we left the main path; and proceeding a short distance Northward through the woods, found ourselves on the brink of the deep pit-crater of "Moko-opuhi;" startled by suddenly looking into it, for fifteen hundred feet downwards. This is the eighth in the series of pit-craters that extend in a line from the seat of volcanic action within the Great Crater to where the plain ceases, by the country beginning to decline towards the Northeastern coast. They seemed therefore to have been formed by undermining, by the removal of material at a great depth beneath the surface; being situated in continuation of the great Crevice of formation and eruption.—The ninth and last pit-crater, called the "Mu," was visited by Mr. Drayton; and is represented on his map, as the largest of the pit-craters, much exceeding a mile in diameter.

A small patch of the new lava was lying close to the farther brink of the eighth pit-crater; and in a line from this point Westward, we soon fell in with two other small patches of the new lava. Next beyond, we arrived at the seventh pit-crater, called "Arare;" and found it nearly circular, about half a mile in diameter, and perhaps a thousand feet deep. The bottom was observed to be a blackened lake-like floor of the new lava; and there were marks of its level having once been three hundred feet higher up.

The Eruption in May commenced by molten lava making its appearance at the bottom of this seventh pit-crater: giving rise to the report, that "a new volcano had burst forth on Hawaii." The ingress took place on "Saturday;" but the new lava soon "sunk down and cooled," and a little beyond, made its appearance in the plain above, in the three small patches just mentioned. Instead of next entering the deep eighth pit-crater, the new lava split the mountain that projects alongside, and came to the surface in the plain beyond, in a Fourth new lava-patch; which rests on the authority of Kaivi, Mr. Drayton's guide. After another interval, it came to the surface in a Fifth new lava-patch; according to Mr. Drayton's map, Northeast of the ninth and last pit-crater. The next, or Sixth new lava-patch

was described by Kaivi as very extensive, and as not visited by Mr. Drayton. The remaining patches of the new lava are the three in sight at the intersection of the Kaimo path. According to the concurrent testimony of eye-witnesses, the new lava-patches made their appearance in regular succession, the hindmost cooling as a new outbreak took place in front, "until the final one on Monday" below the Kaimo path: when the molten lava flowed continuously over the country, and "did not reach the sea until Wednesday." The sinking down of the lava within the Great Crater, according to Rev. Mr. Coan, corresponded with these outbreaks; leaving the empty pit, that at the time of our visit was just beginning to refill. Our own measurements proved, that the empty pit was large enough to contain the molten mass that reached the sea.

At Hilo, "there were no earthquakes during the Eruption;" but on the opposite side of the new lava-stream, "*earthquakes* were felt, both before the Eruption and during its continuance. Nevertheless, they could not be identified with the opening of the crevices to discharge the lava." On this point, I was particular in my inquiries: for the ground here really opened, as it is sometimes imagined to do during earthquakes; and really moved, during the gaping of the crevices; and yet the people standing on either side were not aware of the movement.—Rev. Mr. Green and Rev. Mr. Andrews were once "standing on the 'black ledge,' looking down upon the great molten lake, when an earthquake that shook the whole island took place; no change was perceptible in the molten lake, nor anywhere in the interior of the Great Crater, except that a few loose pebbles were shaken down around the walls."—During my stay on Hawaii, but one earthquake took place; regarded by Rev. Mr. Coan at Hilo, as "quite a violent one;" but on the summit of Mauna Roa, it was not perceived by myself, nor by any member of our large party there.

Just beyond the seventh pit-crater, we rejoined the main path; and proceeded to some sheds that had been built by the natives for the accomodation of travellers. We concluded to remain here for the night; as there was a heavy rain; which continued most of the time until dark. We were now at the base of Puhuru-huru, or the "hairy mountain;" the Second in the series of lava-mountains, that succeed each other in a direct line, from the Great Crater to the extreme North-eastern point of the island.

On the morning of the 26th, I ascended Puhuru-huru: from its irre-

gular outline, mistaken for a mountain, though only three hundred feet or so in elevation. It proved a continuous ragged lava-mass, of light and cindery consistence throughout; the summit containing a circular pseudo-crater, some three hundred feet in diameter by two hundred feet deep, with thin and very steep walls. The atmosphere having been cleared by the rain, there was a fine view of the route of the recent Eruption; the position of the sun rendering conspicuous the columns of rising steam, which extended in a perfectly straight line towards a point a little Eastward of the Nanavali sand-hills. These were in plain sight: and a white speck occasionally making its appearance at their base, could only be the surf; visible notwithstanding the distance, estimated at "thirty miles." The split through Kanenuyo-hamo, the Third lava-mountain, was shown by rising steam to be halfway down its Northern slope: and it was now perceived, that the line of the recent Eruption was not exactly parallel with, but obliquely intersected the line of the lava-mountains.

Kanenuyo-hamo, the Third lava-mountain, intercepted the view; being much larger and loftier than Puhuru-huru; and according to native testimony, having a pseudo-crater in its summit.—The Fourth lava-mountain, Ohaiauru, about halfway to the Kaimo path and in plain sight, was also said to have a pseudo-crater in its summit.—The Fifth lava-mountain, Kereu, was spoken of as beyond the Kaimo path, and as destitute of a pseudo-crater.—The Sixth lava-mountain, Koruakaveri, was subsequently pointed out to me; a long eminence, which somewhere contains a pseudo-crater, with a pool of water at the bottom: "in which fishes will live so long as the water remains of a green color, but the water sometimes turns red, when the fishes all die."—The Seventh lava-mountain was called Kopohu; a lump on the sea-side, at the Northeastern extreme of the island, and not far from Nanavali.—On another occasion, the First lava-mountain, halfway between the Great Crater and Puhuru-huru, was found by myself to be about a hundred feet high; but its pseudo-crater extending downwards a like distance below the surrounding plain, and some four hundred feet in diameter. Between this and Puhuru-huru, I visited another ragged lump of lava; which, though only seventy feet high, evidently forms a part of this series of lava-mountains.

Descending from Puhuru-huru, I crossed the main path, and proceeded to the sixth pit-crater; called Arare-iki, or the "little Arare;" being circular, nearly a third of a mile in diameter, and about five hun-

dred feet deep. The bottom seemed in great part composed of sand, perhaps fragmentary lava, with here and there scattered shrubs and *ferns*. Some threads of *capillary obsidian* were met with; the first remarked by myself on this Windward side of the Great Crater.—The fifth pit-crater, Varerau-kawaihi, was found to be oblong, three-fourths of a mile in length by half a mile wide, and containing two pits; distinct at the bottom, with a more shallow shelf at one end. The extreme depth seemed eight or nine hundred feet; the bottom being overgrown with scattered ferns, among which, the small tree-fern, *Blechnum Fontanesianum*, was distinctly made out.—The space beyond was not traversed; but two days afterwards, I visited a pit-crater, which I supposed to be next in order; and which proved the fourth. It was nearly circular, about a quarter of a mile in diameter, and six hundred feet deep; with steam arising from old fissures on the Northern brink, and in the Southern wall, and the bottom chiefly covered with blocks of lava.—The next or third pit-crater was slightly oval, seeming a quarter of a mile in diameter, by eight hundred feet deep; with much steam arising from old fissures in the Northeastern wall. Bits of *pumice*, of ancient date, were scattered around; being the only pumice I met with to the Windward of the Great molten lake.—Passing a sudden descent of about a hundred feet, the line of settling at a right angle with that North of the Great Crater; half a mile within the sunken district, I found the second pit-crater; the smallest in the series, being only about seven hundred feet long, by five hundred wide, and three hundred deep. Less than a mile beyond, is the first pit-crater; also small, and perhaps to be regarded as an appendage of the Great Crater, being near the Southeastern brink.

The Hawaiian Group contains only four lava-fountains, or real seats of volcanic action; three of which are on the Island of Hawaii. Of the numerous pseudo-craters, secondary results of volcanic action, four different kinds can be distinguished.—First, the pit-craters; most of them contained in the series just mentioned.—Second, the small, well-defined pseudo-craters of the ragged lava-mountains; perhaps all of them enumerated above.—Third, the heaps of scoria and fragmentary lava; deriving, as at Nanavali, their crater-like shape, from the material being thrown from a centre upwards and outwards. These heaps are of all sizes, from ten feet to nearly a thousand feet high; occurring chiefly on the great mountains on Hawaii and East Maui, in linear series down the flanks, and sometimes scattered; some even within

the terminal craters of Mauna Roa and Mauna Haleakala.—Fourth, the coast-craters; confined to the sea-side, but extending farther Westward in the group than the other manifestations of volcanic action. Six of these coast-craters came under my own observation: two at the North-eastern base of Mauna Kea; one on West Maui; and three on Oahu; besides the abnormal crater-like eminence there, containing the salt lake.

THIRD VISIT TO THE GREAT CRATER. Towards noon, I returned to the encampment at the sheds; and our party was soon in motion, the path leading Westward. At the end of about three and a half miles, a small pit, two hundred feet or so in diameter by a hundred feet deep, was pointed out on the right, close to the path; but so overgrown with trees, as not readily to be detected. A similar one was shown a little farther on, and others were said to be in the vicinity; called collectively by the natives, "Lua-iki" or the "little pits." To the left of the path, at the distance of only twenty yards through the thicket, I found myself already on the brink of the Great Crater; looking down into the pit-crater of Kilauwea, and its prolongation at this end, in a shallow sack or shelf. About 2 P.M., we arrived at my former encampment, at the intersection of the Hilo path.

The molten lake, which a fortnight previously "sunk down during one night eighty or ninety feet," had not regained its usual level; and its surface being about thirty feet below the bank, it was only occasionally, that the top of one of the spouts came into view: this being the height assigned them by Captain Wilkes's direct measurements.

About 9 P.M., while we were yet watching, the whole Southern bank in a strip of some acres fell at once. As the mass disappeared beneath the fluid, a great light was given out; the surging to and fro, for many minutes, almost reaching the top of the bank. The Second or smaller lake, remained throughout the evening entirely filled up, and in all directions overflowing; a few cracks only, immediately around the centre, emitting light: once, it seemed to assume activity, and for a short time gave out a great quantity of light. From this Second lake, a large accumulation of overflows had been poured forth during my absence.

On the morning of the 27th, I descended with others into the Great Crater by the usual path, and proceeded to the bottom of the central pit. Among other circumstances that seemed unaccountable and perplexing, was the fact that every overflow of either lake produced a different kind of lava; often very strikingly different. Some of the

kinds were light, fibrous, and spongy throughout, almost like pumice; other kinds had the vitreous crust, and this too varied, having in some instances a metallic leaden hue; while the lava of the great overflow before-mentioned, was in a thick layer, very heavy and solid. This indeed seemed the only feature that was tolerably constant in these overflows; that the solidity seemed much in proportion to the thickness of the layer.

The large lake having so long remained deeply sunk below its banks, the opportunity seemed favorable for approaching it; and on setting out, I was soon joined by Lieut. Colvocoressis. Notwithstanding the length of time since the last overflow, the lava-surface on the way proved very hot; but the heat did not increase in advancing; and we succeeded in reaching the brink. We were here thirty feet above the surface of the molten lake; in its wide extent, presenting an accumulation of heat that threw into insignificance all fires of fuel. Facing the fluid was impossible, except for an instant; and a view could only be obtained by approaching the brink backwards, turning with an even motion around, and quickly retreating; to again repeat the movement. It is true, the lava-spouts were close at hand, along this margin of the lake; but the heat seemed scarcely less intense throughout; and even where the surface was darkest and most quiet, the lava-cliff at the line of contact was heated beyond the grade of redness almost to whiteness. The condition of things lower down and underneath could not be known; but independent of the warning of the previous evening, the banks were obviously unreliable: the currents too were not altogether constant, but a slight divergence once took place towards the spot on which we were standing; which was besides directly over the seat of fiercest action. The perpetual commotion did not however produce noise enough to drown conversation; according entirely with my previous experience at greater distances.

On our way back, the smaller lake was observed to be widely-overflowing; and at one time we were apprehensive, lest the fluid should extend from cliff to cliff and intercept our return; but the point of danger was passed without difficulty. On gaining the "black ledge," a muttering noise was heard, which at first seemed to come from the bottom of the Crater; but a streak of rising dust soon revealed the descent of a slight avalanche down the steep Western bank.

After ascending out of the Crater, I was detained at the encampment by rain; which continued falling rather steadily for some hours,

until 4 P.M.: I then proceeded to a shed I had given directions to have erected upon the Eastern brink, beyond the Isthmus. Finding satisfactory arrangements made for passing the night there, I kept on as far as the Southeastern slope, and again descended into the Great Crater; passing across the "black ledge" to the part immediately overlooking the molten lake. The view at night was much nearer than from the Western brink of the Crater; but the aspect of the molten lake was not materially changed. The clouds overhead were however rendered more lowering, which I mistook for the threatenings of a storm; and accordingly hastened my return.

On the morning of the 28th, I walked Eastward; following the series of pit-craters already described. In this direction, and all around to the Southward, the whole country seems declining towards a centre, forming a concavity rather than a plain. In the South, were three parallel lines of subsidence, each marked by a long low cliff, conspicuous in the distance; and it was also perceived, that the country containing the Great Crater is less elevated than a portion of the route of the recent Eruption; in other words, that the Great Crater is situated to the Southward of the wide culminating ridge of the island. The wide concavity just mentioned was once the seat of an *eruption of sand;* that, according to Hawaiian annals, "came up through fissures, producing for a time total darkness, and destroying a Hawaiian army that happened to be passing by."

From the fourth pit-crater, I proceeded South to the nearest of the low cliffs of subsidence: which I traced West-southwest about four miles, curving but very slightly. Leaving this, I reached the S. S. W. portion of the Crevice of formation and eruption at a point about two miles from the Great Crater. The Crevice proved a quarter of a mile wide, as marked by several gaping parallel fissures, new ones beginning as others terminate: the accompanying lava-eminences were much smaller than those of the Northeastern portion of the Crevice: the first in the series was near at hand, a long hillock about seventy feet high, composed of ragged scoriaceous lava.

Along the S. S. W. portion of the Crevice, the country is lowest, besides gradually and regularly declining in the distance; the line of vision outwards being uninterrupted. Mr. Brackenridge, in proceeding from the Great Crater, found this crevice "extending some eight or ten miles through an almost continuous sandy plain, nearly destitute of vegetation; and where there is any, the *Silenoid* appeared to be the

prevailing plant. Further on, along the brink of an abrupt descent, was a mere line of trees; and some difficulty was experienced in getting down, on account of the loose fragments. After reaching the sea-side," Mr. Brackenridge found himself "precluded from the water by a low precipice that seemed continuous all along that portion of the island." He succeeded however in "procuring a living Littorina; which he brought back with him," as evidence that he had been at the sea-side during his twelve hours absence; "from 9 A.M. to 9 P.M. in going and returning" to the Northern brink. The Great Crater being therefore only sixteen miles from the sea, it may excite surprise, that the eruptions should not always traverse this seemingly weaker portion of the island.

I returned to the shed late in the afternoon; and at dark, in company with John Ely, and a native, descended once more into the Great Crater. On reaching the central pit, a party from the Vincennes was just barely distinguishable, above, on the Western brink of the Crater; and we could sometimes hear their shouts. We could distinctly feel in our faces the glow of the molten lake: and while looking, a stoppage once took place in the surface-movement; but a new layer soon formed, which passed gradually over the still portion, when the usual movement was resumed. The lava-spouts did not always keep close to the margin, but occasionally shifted their position, to the extreme limit of a hundred feet outwards. On inclining the head laterally, the lake with its banks seemed greatly enlarged; an optical illusion shared both by my interpreter and myself, and doubtless attributable to the change in the angles of vision.

The sinking down of the smaller lake after an overflow, proved by no means a quiet process: there was a general bursting up of the surface, with violent thrashing, scattering of fragments, and the emission of much light; after a few moments, the banks of the lake came into view, and its surface sinking down soon ceased to be luminous. During the night ensuing, spent by us at the shed, the smaller lake was reported to have again widely overflowed.

On the morning of the 29th, I crossed the Isthmus to the Hilo path, and took leave of the Great Crater.

In considering the causes which once produced a Tropical Climate over the whole Globe, it might be supposed, that the transition of the planet from its molten state would furnish a long-continued supply of heat. The fallacy of such a supposition was now evident. The im-

mense furnace of the molten lake, with all its intensity of heat, fails to produce the slightest impression on the atmosphere around the brink of the Crater: and after standing on an area heated a few feet below almost to whiteness; placing my hand upon rock, that a foot beneath set on fire wood pressed against it; the conclusion was unavoidable, that the Earth's internal heat has had nothing to do with climate.

Lava from the Great Crater is to be found only in the immediate neighborhood of the crescent-like Crevice of formation and eruption: and notwithstanding the above-described lava-stream, and similar ones that have preceded it, the amount remaining on the island is comparatively trifling. The Great Crater itself is in Mauna Roa lava: and with the line of pit-craters, shows that the Mauna Roa lava-streams are piled upon each other more than a thousand feet vertically. The Great Crater is in fact only a lateral almost basal crater of Mauna Roa; and the whole may be regarded as one volcano.

The ascent of Mauna Roa. To return now to the morning when Captain Wilkes' party, leaving the Great Crater, were proceeding nearly due West, towards the summit of Mauna Roa. The path continued distinct for some miles, over a surface evidently a little declining; where the lava in flowing had risen several feet above its level in undulations or knolls. Taller shrubs soon began to make their appearance, four to eight feet high, and many of them clustered: as the *Dodonœa*, more abundant than I have seen it elsewhere; the *Osteomeles*, also unusually abundant; and of more generally-distributed shrubs, a *Metrosideros; gen. Epacrid.*, two to three feet high; a *Vaccinium;* and others. Extensive patches of soil were observed to be in large proportion bare; even where decomposed into fine dust, and seeming well-adapted to support a vegetable growth.

At length the ground began perceptibly to rise; the ascent commencing with a dry grassy savanna, two to three miles wide, and almost like a belt; extending, say from the elevation of thirty-eight hundred feet to that of forty-four hundred. Within this savanna, the rock was seldom exposed; the surface being entirely covered with a matted sward of *gen. Poac.;* a remarkable grass, two to three feet high, chiefly leafy at the summit and very rarely in flower; its hard consistence, and the want of water, seeming to preclude pasturage. In crossing, I met with but three other kinds of plants: in places where the growth was somewhat thinner, an occasional stem of a *Pteris* resembling P. aquilina, or of the twining *Cocculus? Ferrandianus;*

while one slight hollow was surrounded with the golden flowers of a Bidens-like *Campylotheca*.

Beyond the irregular dry grassy belt, the usual lava-surface recommenced; with large shrubs and scraggy *Metrosideros* trees, rarely thirty feet high, growing in a scattered manner and chiefly out of cracks.

Our party being detained by the transportation of astronomical instruments, I proceeded leisurely; and towards sunset, reached the spot selected for an encampment; which proved the 6th from the summit of the mountain. The estimated elevation was five thousand feet; the surface around having become a little more even, with patches of soil in which grasses were growing in tufts: as the last-mentioned *gen. Poac.;* a *Trisetum*, resembling T. airoides but much larger; an *Agrostis* having the panicle coarctate; a *Panicum*, near P. capillare; and more rarely, a hairy *gen. Panicoid.* In the cracks of the lava-surface, the grasses were replaced by trees, shrubs, and certain more humble plants; the species being the same as in the vicinity of the Great Crater, and the following five abounding: the *Metrosideros* having thick woolly leaves; a *Vaccinium.; gen. Epacrid.;* the *Fragaria*, here only in leaf; and in somewhat arid situations, the *Pteris ternifolia ?.*

The Second day, we continued ascending the black lava-streams that seemed to come tumbling down upon us without end. Caves were pointed out, some of them one or more miles in extent; formed apparently by the surface of a lava-stream cooling, while the liquid portion beneath continued flowing on. The immensity of the accumulation now began to claim our attention; as it was perceived, that the lava-streams from the summit of Mauna Roa had flowed down the flanks all around into the sea; excepting only in the direction of Mauna Kea, as already mentioned. An hour-glass communication with the central fluid of the globe has here measured time by the accumulation outside; and the process had a beginning. What proportion of the accumulation may have passed into the ocean, there are perhaps no means of ascertaining; neither have careful measurements been made of the mass remaining on the land; but the elements of the problem may at least be stated: To form a layer eighty miles square by a thousand feet deep in sixty-four hundred years, would require an annual layer one hundred miles long by one mile wide and ten feet deep. One-tenth of this amount is perhaps within bounds: for from the Eruption of 1832 to that of 1840, the accumulation in the Great Crater was at

the rate of four square miles ten feet deep annually; independent of the accumulating process going on simultaneously in the summit of Mauna Roa.

The thin scraggy *Metrosideros* woods continued; especially where the lava-surface was much broken up; but in various places, the trees had been recently overrun and destroyed by fires. In the afternoon, trees rather suddenly ceased; by the *Metrosideros* becoming dwarfed, and with the accompanying shrubs, everywhere gnarled and stunted, assuming the aspect of mountain-exposure. Half a mile beyond, and at the elevation of "6071 feet," we established our 5th encampment; afterwards a fixed station, from being the highest point on the mountain where wood for fuel is procurable. Throughout most of the day, the *Santalum* continued rather frequent, occurring however only in the form of a shrub: of other Tropical plants reaching the elevation of this encampment, I can enumerate only; the *Dodonœa*, orange-fruited *gen. Coffeac.* (No. 2), *Daphne*, *Dianella*, and *Pittosporum* (No. 5): a full list of all the plants observed here will be given presently.

7. The Hawaiian Mountain-region.

Upper portion of Mauna Roa. The Third day was spent at this encampment; and towards sunset, the country below became gradually concealed from view by clouds collecting at our feet: and remaining stationary and well-defined; like a sea of intensely white, fleecy, feathery snow-drifts, extending outwards from the mountain-side, all around to the horizon. In many repetitions of this spectacle witnessed afterwards, the sea of snow-drifts always formed at almost exactly this same level. The evenness was however interrupted over the Great Crater, by the smoke-like vapor rising so high as to be intersected half-way; its place in the daytime being marked by a huge heap of these fleecy snow-drifts; that at night were illuminated by the fire beneath, as though the volcano was bursting through the clouds. The mockery of so much seeming fire aggravated the surrounding chilliness; for with the continued aridity, the nights at this encampment were cold: while the days were oppressively warm, through reverberation of the sun's rays from the lava-surface.

Nearly one-half of the mountain-surface around consisted of bare lava; the remainder being the patches of soil in the inequalities: there

was even a rather distinctly-marked ravine, with indications of a commencing mountain-torrent, and dampness in its bed. I spent the time here in forming a complete flora of an area a mile and a half square, extending upwards from the level of our encampment; say, from the elevation of 6100 feet to that of 6500. Taking care not to descend below the first-named limit, the following thirty-seven species of plants were the only ones met with: *gen. Silenoid* (No. 3), rare; *Dodonæa*, with lanceolate leaves, and large capsules; *gen. Pelargonioid* (No. 1), not abundant; *Pittosporum* (No. 5), in sheltered spots, and somewhat rare; *Edwardsia*, very little changed by mountain-exposure; *Metrosideros* (bis No. 4), nowhere more than fifteen feet high, by eight inches in diameter of trunk; *Metrosideros* with smooth fruit, rare; *gen. Coffeac.* with black glutinous berries, continuing frequent; *gen. Coffeac.* with orange-colored berries not beaked, a shrub not in the least gnarled, but maintaining its usual habit as though unaffected by mountain-exposure; *gen. Compos.* with the leaves decussate and stellately verticillate in fives, rare; *Argyroxiphium* with narrow silvery leaves, commencing about a quarter of a mile above our Encampment; *Vaccinium*, only in flower now, while lower down it occurred in fruit; *gen. Epacrid.*, continuing abundant; *Plantago* with lanceolate leaves, growing in the dry bed of the commencing mountain-torrent; *Daphne; Santalum*, now rare; *Exocarpus*, frequent, but occurring only in the form of a low semi-decumbent branching shrub; *Dianella*, rare; *Smilax* (No. 4), growing in sheltered hollows; *Hamelinia*, the leaves seeming narrower than usual, rare; *Luzula*, bis, tall with hairy radical leaves, rare; *Morelotia*, bis Great Crater, growing in tufts a foot high, abundant; *gen. Restioid*, small and Iris-leaved, rare; *Carex*, having something of the habit of C. acuta but stouter, growing in the slight and dry ravine; Carex or *gen. Caric.*, growing in low tufts in the slight and dry ravine; *Agrostis*, bis; and *Trisetum*, bis, the grasses seeming of the same set as lower down on Mauna Roa, but they had become more rare; *Aira*, but the awns wanting or very short, rare; *Lycopodium* somewhat like L. clavatum, growing in cracks of the lava-surface, rare; *Acrostichum*, chaffy, with the frond lanceolate, growing in cracks of the lava-surface; *Polypodium* having the habit of P. vulgare but larger, more rare than below the Great Crater; *Polypodium* with a simple lanceolate frond, growing in a cave; *Pteris* resembling P. aquilina, very rare; *Pteris ternifolia?*, rare; *Asplenium* having almost the habit of Woodsia, growing in the slight and dry ravine, rare; *Asplenium*,

bis, having the habit of Trichomanes, growing in the slight and dry ravine; and *Cenomyce rangiferina*, the reindeer lichen, frequent.

The Fourth day, our party recommenced ascending the tumbling lava-streams; from their freshness, almost requiring boldness to face them; lest those above in the distance should be in the fluid state. Of the plants just enumerated, many soon disappeared; the only additional species extending from below, being *Rumex* (No. 2). Of the few species belonging to the upper portion of the mountain, the *Argyroxiphium* and the stellate-leaved *gen. Compos.* began to show themselves above the sea of clouds, as already noted: next in order, the low Erigeron-like *gen. Asteroid* commenced, after about two miles, at the elevation of 6600 feet. No further additions to yesterday's List were met with in a careful search throughout the day: the surface above the elevation of 8000 feet consisting in much the larger proportion of exposed lava, and plants becoming rare.

We stopped for the night and established our 4th Station at the elevation of about 9000 feet; a little beyond a cave underneath the lava-surface, that afforded shelter to the natives who accompanied us. Soil had now chiefly disappeared; and plants were thinly scattered, in something like the proportion of a single stock to a hundred square yards of surface; lichens having entirely ceased.

The Fifth day, I made an excursion Northward about four miles, keeping the level of the Station as nearly as possible; but returning by a higher level farther up the mountain. I did not on this occasion particularly note the plants: but there were no additional species.— In my subsequent excursions, I was careful to record all the species that could be found growing above the level of the 4th Station; and the meagre list is here inserted: the Erigeron-like *gen. Asteroid*, bis, ceasing half a mile beyond at the elevation of 9200 feet; *gen. Compos.* with stellate leaves, bis, ceasing at this Station; *Vaccinium* (No. 3), with elongate blue berries, commencing at this Station, and ceasing at the elevation of 11,000 feet; *gen. Epacrid.*, bis, ceasing at this Station; Carex or *gen. Caric.*, bis, ceasing a mile beyond, at the elevation of 9400 feet; *Agrostis*, commencing above this Station, and ceasing at the elevation of 11,000 feet; some of the grasses seen lower down extending to this Station; *Polypodium*, bis, extending above this Station; *Pteris ternifolia ?*, bis, found above this Station by Mr. Brackenridge; *Asplenium* with the habit of Woodsia, bis, growing in cracks, and one of the plants extending highest up the mountain; *Asplenium*, Tricho-

manes-like, bis, extending above this Station; *Hypnum ?*, a fine species, growing in a cave just above this Station; and *gen. Musc.*, growing in company in the same cave.

The Sixth morning, I left the tent at an early hour, apprehending no difficulty in procuring a supply of water; from the very heavy rain throughout a great part of the preceding night; but there was not a speck of moisture visible, the lava-surface being everywhere as dry as though it had not been rained on for months. Mr. Drayton, Mr. Brackenridge, and others, who had returned from the summit, proceeded down the mountain. In continuing the ascent, I soon joined Dr. Judd, and we kept on together.

At the elevation of ten thousand feet, plants had become exceedingly rare; occurring only in something like the proportion of a single stock to a square mile of surface. At the elevation of 11,000 feet, plants ceased altogether: and a mile beyond, say at the elevation of 11,300 feet, we first fell in with patches of snow; small, indeed, but marking a decided change in climate. At this precise point, our 3d Station was subsequently established; on account of a supply of water near at hand, in a large pool concealed from view in a cave. We continued on as far as the 2d Station, already established, where we passed the night.

The Seventh day, we proceeded to the summit: where Capt. Wilkes had found a single specimen of a moss, *gen. Musc.*, growing in a slight steam-vent: but so far as my own explorations at different times extended, I was unable to find a plant growing within five miles of the summit in any direction; nor until descending to the already-mentioned limit of 11,000 feet. It is true, soil is almost entirely wanting; and in the possible absence of rain, the porous lava-surface absorbs at once the melting snow; the climate being also somewhat arid, very little moisture is deposited in any shape, so that the lava is hardly subject to decomposition. Animal life is of course wanting; the wide expanse of blackened lava-streams recalling the primeval state of our planet; whose surface must have remained a solitude to this day, but for the interposed vegetable creation.

Mauna Roa everywhere preserves the regularity of a vast gently-rising dome; whose curve is so gradual, that the summit includes a very extensive area; though hardly sufficient to limit "a separate horizon." The most elevated point, not at first very obvious, was ascertained by Capt. Wilkes to be "13,463 feet" above the sea. The

crater is precisely terminal; and consists of a real crater with two minor pit-craters, all included within a common rim or brink. The main or real crater was found to be nearly circular, "less than two miles in diameter," and about a thousand feet deep, to its black lake-like floor: there was no central pit, and no fire visible; but in various places, small quantities of whitish smoke were rising, barely distinguishable in the distance. Towards noon, I descended into the crater down the Northeastern slope; which proved steep and dangerous, from the large blocks not being firmly fixed in their places. The lake-like floor was now perceived to be by no means even; the lava-layer being very thick and solid, huge slabs ten to twenty feet across were turned up edgewise, as though the bottom at frequent intervals had been burst up from below; apparently through the agency of the light cindery scoria that rose into view in some of the cracks. The lava-surface that had been more or less upturned, was black and shining, as though recent; yet hardly seemed the product of the latest eruption, "five years" previously. Travelling being in this manner impeded; when a quarter of the way across, I found the day far advanced, and concluded to return. The trip however occupied less time than was anticipated, and I regained the brink of the crater after an absence of only three hours. I thence proceeded down the mountain to the 3d Station; and returned as far as the 2d Station, where I stopped for the night.

On the morning of the Eighth day, everything was covered with snow; and as I could do nothing therefore at the summit, I went down the mountain to the 4th Station: and afterwards, reascended as far as the 3d Station, and passed the night in Lieut. Alden's tent. The night proved unusually cold; water freezing solid within the closed tent, where also the temperature fell to 20° Fahr.—On the summit, Capt. Wilkes found the temperature on one occasion as low as "13° Fahr.:" a severity of cold quite unexpected within the Tropics, and attributable, with the sea of clouds, to the isolation of the Hawaiian mountains: in these and other respects, presenting a striking contrast with the Peruvian Andes.

The Ninth day, I went part way down the mountain, towards the 4th Station; and reascended, all the way to the summit; arriving in time for a walk about two miles Southward, keeping along and around the brink of the crater. As the sun went down, the dome-like summit of the mountain was distinctly projected in the opposite direction on the heavens, like the shadow of an eclipse.

The Tenth morning, I set out to make the circuit of the craters: and on reaching the Southern lateral pit-crater, found it nearly circular, small, but very deep; while in further correspondence with the state of things at the Great Crater, a lava-stream squeezed up through a crevice to the top of the brink, had thence flowed downwards and filled the bottom with a lava-lake.—At a little distance Southwest, a small and detached pit-crater was discovered after I left the summit of the mountain.—Beyond the lateral pit-crater, on again approaching the main crater, *steam* was issuing in quantities from some fissures parallel to the brink; being the only steam-vents I met with above, outside of the crater. From these same fissures, a current of light cindery pumice-like lava had issued, and soon spreading nearly a mile in width had poured down the Southwestern flank of the mountain; some hillocks of streamy masses of very light scoria were near at hand, also marking the continuation of the Crevice of formation and eruption.—Farther on, the usual ancient lava-streams reappeared, and continued all around the higher or main Western portion of the brink. At the Western extreme, I fell in with some blocks of a compact greenish-grey rock, not lava, whose presence did not seem readily explicable; afterwards found to be the material of the vertical wall of the crater beneath, to be again mentioned. On looking outwards and part way down the Western declivity, this seemed a little the steepest portion of Mauna Roa. In the distance, three mountain-summits rose out of the sea of clouds, like so many islands out of the ocean: in the North, Mauna Kea, its summit projecting above the horizontal line of vision; in the West-northwest, Mauna Hualalai; and between, the more distant Mauna Haleakala; the real ocean and islands containing these mountains, being concealed from view, underneath the clouds. The wind during all this time was observed to be precisely Northwest.—Continuing on, the Northern lateral pit-crater was found to be less distinctly marked than the Southern; being a mere oblong basin-like cavity, where the general including brink was traced with difficulty: though comparatively shallow, it contained a lava-lake; also a hillock some sixty feet high, of the color of pumice, and probably consisting of scoriaceous fragments. Real *pumice*, altogether similar to that of the Great Crater, I met with in various places during this day's excursion; but Peli's hair, or capillary obsidian, was not seen on the summit of the mountain.—I next reached the Northern depression of the summit, and what seemed to be a long

crevice of eruption extending directly towards Mauna Kea; there was no issuing lava-stream, but lava had been spattered out, and there were some hillocks of the light streamy masses of scoria, first seen on the opposite brink, and afterwards on the bottom of the crater. Just beyond, I came upon the real Crevice of formation and eruption; extending Northeast entirely clear of Mauna Kea, and marked by a long series of scoria-hillocks on the top of a distinguishable prominence of the mountain-flank; much resembling the broad parallel ridge from the Great Crater in the distance. A mile and a half farther on, I left the including rim, which continued traceable around a wide shallow depression; and proceeding direct, reached the Encampment 6½ hours after starting; so that allowance being made for walking very leisurely, the circumference of the three craters cannot exceed nine miles.

The Eleventh day, I descended into the crater down the Southern slope; a steep and difficult declivity. The bottom proved of the same character as on the opposite side; so that travelling over it, was almost continual climbing. Proceeding towards the Western wall, I reached the hillock of cindery pumice-like scoria, forty feet or more high, which forms a conspicuous object from the brink above. Beyond this hillock, the lava-surface became smoother, as though more recently melted; and there were various indications of the close vicinity of the fire. "Fumaroles" were frequent, and contrary to our experience in the bottom of the Great Crater, most of them emitted more or less steam; the sulphur fumes being in some places so abundant, as to render crossing difficult. Besides the incrustations of impure *sulphur* in the clefts of issue, a tasteless whitish powder was intermingled; which, where the steam was hottest, was sometimes formed into little stalactites, by reversing the usual process. The Western wall, chiefly perpendicular, was found to be composed in great part of the compact greenish-grey rock above-mentioned; probably altogether argillaceous, but resembling some varieties of lime-stone; and found afterwards forming a portion of the component rock of Mauna Kea. Being the rock in situ, and not lava, here was the original wall of the crater in the original summit; showing, that Mauna Roa is not a colossal pile of accumulated lava-streams, as might otherwise be supposed. The principal portion of the Western wall is however composed of unequivocal lava, of ancient date, yet much resembling that of the walls of the Great Crater; in some places reddish, in other places blackish, containing irregularly-shaped cells, and also studded with little tufts of indistinct

white prismatic or acicular crystals. In returning, I did not have time to visit the diminutive crater-like lake with congealed overflows, situated with a second heap of pumice-like scoria, close to the Eastern wall and directly under our Encampment. I ascended out of the crater by the Southwestern slope, which proved a better route than the two others I had tried; and reached the Encampment after six hours absence.

The Twelfth day, I descended the mountain to the 3d Station; and then, keeping nearly the same level, proceeded Northward to the uppermost of the scoria hillocks, so conspicuous along the great Crevice of formation and eruption. Some of these hillocks were evidently more than a hundred feet high; the uppermost proved to be about sixty, composed of fragments of cindery scoria, and from its summit, the top of Mauna Haleakala on Maui was in sight. A lava-stream, a mile or more wide and tolerably recent, had issued from the Crevice of formation and eruption; but was shallow, and in some places irregular and indistinct, with much of its surface broken up into soft pumice-like "climpers." In tracing the stream upwards, I fell in with a long narrow strip of what may be termed *volcanic ashes;* a kind of impalpable powder not seen elsewhere, very light and loose, into which the feet sunk deeply at every step: most of it was whitish, like alum, but minute fragments of pure sulphur were also intermixed. After ascending about three miles, the lava-stream could be traced no farther; the point where it ceased, being, as much as two miles from the terminal crater; for on directing my steps Southward, and very slightly ascending, I came in sight of the flag of our 2d Station. Descending again to the 3d station, I passed the night in Lieut. Alden's tent: within which, water froze solid as before, the night being clear and still.

The Thirteenth day, I proceeded down the mountain, directly towards the snowy heap of clouds over the Great Crater; presenting by daylight a most chilly aspect. On reaching the level of our 4th Station, at the distance of half a mile Southward, I turned thitherward, and rested an hour in Lieut. Budd's tent. In the afternoon, I continued down the mountain; and just after sunset, reached the 5th or wooding Station; where I passed the night. Already in the beds of "climpers," the fragments were observed to be less sharply pointed than above: having undergone partial decomposition, from the increase of moisture and the more frequent rains.

The Fourteenth day, I descended through the seeming snow-drifts, the sea of clouds, into the warmer region below: and towards sunset, arrived for the second time at the Great Crater, as already mentioned.

Upper portion of Mauna Hualalai. This mountain, situated to the Westward of Mauna Roa, was not visited; but was seen projecting high above the sea of clouds, and can hardly be less than eight thousand feet in elevation. From its summit, "a hundred or more craters" are said to be visible; an indication of some new phase of volcanic action. Not many years had elapsed, since a lava-stream gushed out of the flank: on which occasion, "two children, seeing the unknown substance spreading over the ground like tar, one said, 'she would run away,' and escaped; the other preferred to climb a tree, and perished."

Upper portion of Mauna Kea. On the morning when, an hour after sunrise, Mr. Brackenridge, myself, and guides emerged from the upper margin of the forest on Mauna Kea; the ground was in various places frozen; a pool of water on the way, was covered with thin ice; and the whole open country above, often called the "plains," was white with frost. As the frost melted, the ground was found to be in great part covered with grasses and verdure; the rock rarely making its appearance through the soil; yet there was a general aridity, and the beds of the mountain-torrents contain running water a few hours only after heavy falls of rain. The general absence of shrubs was unexpected; the *Acacia heterophylla*, extending into the open country in the form of a scattered low tree, and the *Edwardsia* trees also growing isolated as in a park, contributing to the Australian aspect. Inclining Northward, and continuing the ascent obliquely, we reached some rising ground that afforded a very extensive view: the atmosphere being clear, the eye ranged over the whole breadth of the forest we had crossed, to the sea beyond, and the Bay of Hilo; a sail in the offing was even made out by some of our party; and we subsequently ascertained, that a schooner was at the time putting back. We passed a tolerably distinct bed of "climpers," near the remains of a cattle-pen, and not far from a conspicuous hillock that had served us as a landmark since morning. Just above this hillock, we encamped under the shelter of a projecting rock, in the very bed of a mountain-torrent; regarded as an eligible situation, provided no rain falls on the higher part of the mountain during the night.

The Second day, we continued along the dry mountain-torrent, the ascent having become decidedly more steep. At first, *conglomerate* alternated with the compact rock; that occurring at intervals in the bed of the torrent, preserves in its shallow cavities a supply of water all the way up the mountain: being the same kind of compact rock already mentioned, as occurring at the apex of Mauna Roa. At the end of three miles, we arrived at a small shallow cave, which, as affording some shelter, was selected as our resting-place for the night: being situated a little above the limit of scattered low trees and of firewood, and abreast of the lowest of the two large scoria-heaps, so conspicuous on the flank of the mountain. Towards noon, I proceeded alone farther up the mountain-slope, which soon again became more gentle. I kept on half a mile beyond the Red Hill, the uppermost of the two large scoria-heaps; but the terminal hillocks, now only about two miles distant, were concealed from view by clouds; a driving snow-storm having set in, which accompanied me most of the way back to the cave; where I arrived two hours before sunset. Most of the natives had retired to a larger cave, three-fourths of a mile lower down. The snow-white sea of clouds had commenced gathering far below us at the usual level around the mountain; and in the evening, the heaped-up drifts over the Great Crater were lighted up, as previously witnessed on Mauna Roa.

At daybreak on the Third day, the illuminated heap of clouds looked lurid and ruddy: and at sunrise, with Mr. Brackenridge and one of the guides, I set out for the summit of the mountain. On reaching the terminal scoria-hills, some hundreds of feet high, they were found to be composed in great part of small fragments, almost like gravel, giving way under foot; and the sides being steep, the ascent proved fatiguing, especially as the wind was blowing furiously. On the summit of the First scoria-hill, we rested for some moments under the shelter of a heap of stones, which some one had placed there; but so intense was the cold, that water froze in the bright sunshine; it is true, the time was rather early, more than an hour before mid-day. The distant summit of Mauna Roa was more covered with snow than usual; and notwithstanding all that has been said on the subject, the opening of the terminal crater was plainly visible. We next ascended the Middle scoria-hill, the highest of the three; but a Fourth now made its appearance, detached, a little to the South of West, and regarded by Mr. Brackenridge as higher than the one on which we

were standing; and therefore the extreme apex, ascertained by Capt. Wilkes from Mauna Roa to be "13,656 feet" above the sea. We did not ascend the Fourth scoria-hill, as it presented no peculiar attractions, and the wind blew violently from that direction; the summit of Mauna Hualalai being in sight a little to the left; but we kept on over the Third scoria-hill, until we could look down the declining flanks of the mountain to the North and even the Northwest. We then returned Eastward over patches of snow, a little slippery in some places, but apparently permanent, having become condensed and hardened enough to sustain footsteps; and again reached the base of the scoria-hills.

Mauna Kea is in reality much more even and dome-like than it appears to be in the distance. The seeming peaks on its flanks and summit, are only heaps of scoria; and above the forest, there are no deep ravines, the water-courses making very slight depressions in the flanks. The surface was found to be chiefly covered with soil, often loose earth with small pebbles intermixed, yielding under foot; but there were tracts covered with larger fragments or blocks, in general somewhat worn at the angles. The highest portion of the mountain, more gently-sloping and somewhat rounded, is in great part composed of massive *cellular lava*, like the highest peak on Madeira: there are no lava-streams, no lava-fountain, nor real crater. At the base of the terminal scoria-hills, the compact rock before-mentioned was observed to contain *chrysolite* in squarish nests: while in the lava from the Great Crater, chrysolite occurred only in separate crystalline grains, disseminated more or less abundantly through the mass; sometimes even in the vitreous crust; and in one observed instance, attached to a thread of capillary obsidian.

In regard to the vegetable growth, we were disappointed: especially, as Mauna Kea chiefly retains its original surface, and has not been overspread with lava-streams. The species were chiefly the same as on Mauna Roa, with but very few additional ones; but plants extend much higher up the mountain; and only at the elevation of 12,000 feet, did the ground become fairly bare. Even here plants did not entirely cease, but a few scattered stocks continued in sheltered situations to within two or three hundred feet horizontally of the terminal scoria-hills; say, to the elevation of 13,000 feet.

In descending, we kept the dry bed of the torrent, and passing Red Hill, reached the cave in the middle of the afternoon. We removed at once to the larger cave, three-quarters of a mile lower down. From

this spot, I could myself make out Hilo harbor, bounded by the prolongation called Cocoa-nut Point, and containing a speck in the middle, the Vincennes at anchor: but a *fog*, driving towards the Northeast, soon enveloped our encampment.

The Fourth day, Mr. Brackenridge, myself, and two of the guides proceeded Northward; keeping the upper limit of the *Edwardsia* trees, or the level of about 9500 feet. For the first three or four miles, the ground continued unchanged in character; the vegetable growth so thinly scattered, that it seemed marvellous, how the herds of cattle spoken of as numerous in former times could have found sustenance; especially, as they are said to avoid the *gen. Epacrid.* and *Ranunculus.* Several shallow ravines seemed to promise interesting botanical ground, but after a careful search, we found only one additional species. We next reached a rather distinctly-marked valley, wide and shallow, and covered with gravel and intermixed loose earth. Beyond this, a more broken tract, seemed to be selected by the wild cattle as a retreat, affording some security against horsemen. About twenty in all, in four small herds were met with, and in these narrow ravines there was more vegetable growth; consisting of *Pteris* in beds, with other plants; while farther on, were tufted grasses, an *Aira* being abundant. The country beyond was yet more grassy, with the slopes more even, where scattered *Edwardsia* trees again made their appearance; the whole bearing some general resemblance to the basal portion of the Andes in Northern Chili. We were now fairly on the Northern flank of the mountain; and in descending, took an oblique course Eastward, passing below and along the base of the conspicuous hill. We next entered a thick drizzling mist, and the sun shining thereon, produced a very distinct *fog-bow*, already alluded to. After visiting Douglas's pits, we continued downwards to the forest; and joining the remainder of our party, encamped for the night.

The following morning, we took leave of the Mountain-region; and descended through the forest, as already described.

After my Third visit to the Great Crater, also described, I remained at Hilo until the 15th of February: when, with a party from the Vincennes, I sailed in the schooner Kahalaia, commanded by a Hawaiian.

Upper portion of Mauna Haleakala. The schooner arrived at Lahaina on Maui on the 20th. Our party landed here, and proceeding to East Maui, commenced the ascent of Mauna Haleakala, as already described; entering the Mountain-region on the morning of the 26th.

We were now surrounded by frost, on the Western flank, at the elevation of 6700 feet; where the ground had become more stony, though still green. A little beyond, after passing the remains of a cattle-pen, the ascent became steeper and rock-surface predominated; consisting of *massive lava*, more or less cellular, but the cavities irregular in shape and sometimes rather large. Higher up, there was a larger intermixture of soil, and especially of loose gravel in a somewhat thick layer. There were no lava-streams on this exterior portion of the mountain; which has therefore retained its original surface, resembling in general the higher portion of Mauna Kea, but more clothed with vegetable growth.

On reaching the crest, at the elevation of "9510 feet," we looked down into the so-called "crater;" which is simply a valley, open at each end, or a wide crevice extending across the island; obviously, the unclosed Crevice of formation and eruption. The bottom depressed two thousand feet below our position, yet formed a dividing ridge, with flanks declining in either direction to the sea. We next followed the crest Southward, ascending all the way to the Southwest angle of the wide open crevice; where, on the highest among several hills of fragmentary scoria, the barometer at 1½ P.M. marked 20,896 inches, with the temperature at 36¾° Fahr. There was a driving snow-storm here, accompanied with sleet; but additional observations were taken on successive days by Mr. Drayton, who verified by levelling the superior height of the spot; making the elevation of Mauna Haleakala "10,215" feet above the sea.

Returning part way down the mountain, we found the natives established in a cave, sufficiently capacious to shelter the whole party: and a convenient home for us during our stay. At 6½ P.M., the sun hardly down, the barometer at the mouth of the cave marked 22,562 inches, with the temperature at 43½°; and at sunrise or 6½ A.M., on the third morning afterwards, 22,660 inches, with the temperature at 44°; making, with our other observations, the elevation of this cave "8090 feet" above the sea. In our different excursions, the following plants were found growing on Mauna Haleakala, at and above the elevation of 8000 feet: *Ranunculus*, bis, at 8000 feet rare; *gen. Geranioid*, bis, silvery, rare; *Dodonœa*, growing at 8000 feet; *gen. Coffeac.?*, bis, orange-fruited, abundant; *gen. Eupatorioid*, bis lower down the mountain and the Great Crater, abundant; *gen. Erigeron-like*, bis, small; *Argyroxiphium*, bis Mauna Roa, commencing at 9000 feet and extend-

ing to within a few feet of the summit; *Argyroxiphium*, a species not before met with; *Vaccinium*, glaucous, commencing at 8500 feet and extending to the summit, but rare; *gen. Epacrid.*, bis sharp-pointed of Mauna Kea, abundant; (*Nov. gen. near*) *Phyllostegia*, bis lower down the mountain, small-leaved; *Rumex; Luzula*, bis; *Agrostis*, bis awned sp. of Mauna Kea, growing near the summit; *Aira*, bis Mauna Kea, commencing at 8000 feet and extending to the summit; *Trisetum*, bis summit of Mauna Kea, extending to within a few feet of the summit; *Lycopodium* like L. clavatum, bis, growing at 8000 feet; *Polypodium* with lanceolate frond, bis, growing at 8000 feet; *Pteris* near P. aquilina, bis, extending nearly to the summit; *Asplenium*, Trichomanes-like, bis, extending nearly to the summit; *Asplenium ruta-murar.*, bis, extending nearly to the summit; *Bryum?*, bis lower down, extending nearly to the summit; *Sticta-like* with a yellow margin, bis, growing at 8000 feet; *Parmelia*, bis Mauna Kea, growing near the summit; and *Lecidea geographica?*, bis, also growing near the summit.

On the 27th, Mr. Brackenridge and myself proceeded Northward; keeping the level of the cave, until we reached the wide open volcanic cleft. We then followed the margin or crest downwards; meeting unexpectedly with some spongy soil; and descending rapidly to the limit of the forest, "6719" feet above the sea. The ornamental red-flowered *gen. Geranioid* here fairly became a tree, fifteen feet high, with the trunk eight inches in diameter: and we again had occasion to remark, the absence of vines, whether woody or herbaceous, throughout the Hawaiian Mountain-region. By means of cattle-paths, we penetrated a short distance downwards into the forest: which consisted of low trees, with a tangled undergrowth of shrubs, ferns, and other plants.

Returning to the volcanic cleft, we descended into it; down a very steep declivity, rendered less difficult by a thick covering of low shrubs and other plants, almost as even as though artificially trimmed off at the height of about a foot. The bottom of the cleft seemed occupied from side to side by lava-streams, being probably more than two miles wide; but the fog prevented us from seeing the opposite wall. We were now below the Mountain-region, and at the elevation of about 5700 feet; where the lava-surface was entirely overgrown with rank *ferns*, *Rubus* groves, the green-leaved *Argyroxiphium*, and a variety of other plants, among which were even a few small trees. Higher up the lava-streams, on which we kept ascending, the vegetable growth became rare; especially on reaching the flattened platform-like sum-

mit of the dividing ridge, "7417 feet" above the sea. We had now on our right a steep wall-like ascent of fifteen hundred feet to the brink of the cleft; and surmounting this, we reached the cave at 5 P.M., after a very fatiguing, yet profitable excursion.

On the 28th, I walked around the Southwestern flank of the mountain, and descended below the level of the cave a thousand feet or so; but the fog prevented any distant view in this direction. Some shallow ravines contained the same kind of compact *argillaceous rock* previously observed on Mauna Kea, and in like manner retaining water in diminutive pools: but the rock-surface was everywhere less absorbent than the massive lava of Mauna Kea, and little depressions containing water occurred all the way to the summit.

On the 1st of March, Rev. Mr. Andrews, Mr. Brackenridge, and myself, proceeded direct to the volcanic cleft; down which, the descent of two thousand feet occupied precisely an hour. From the prevalence here of loose earth and gravelly fragments, both on the sides and bottom, the interior presented much of the aspect of a Desert valley; especially as plants were extremely rare. The lava-streams were now found to have come from the Southwest angle of the cleft; and flowing down upon the platform, had divided to the right and left; a portion flowing Northward as already described, and the remainder at first Eastward and afterwards Southward to the sea. The hills of fragmentary lava, five or six hundred feet high, and so conspicuous from above, were now found to rest entirely upon the surface of the lava streams. After proceeding about four miles Eastward, we retraced our steps part way, and ascended the Southern wall. From the brink above, the whole Southern bend of the cleft was in sight; and the lava issuing from it was traceable by its blackness and the fresher green of the vegetable growth on its surface, to its entrance into the sea; where it had made a very considerable encroachment of additional land. "There is no tradition among the natives of an eruption from this volcanic cleft; but one or two centuries ago, a lava-stream burst forth from the Southwestern base of the mountain, and to this day retains its blackness, as though of recent date." Neither *pumice*, nor *capillary obsidian* were met with by us upon this island.

We returned along the margin or brink, ascending rapidly; but in place of passing over the summit, kept around to the Southward, to some scoria-hills, of the series said to extend all the way down the Southern flank of the mountain. A less distinct series of about four

widely-separated scoria-hills occurs on the Northwest flank of the mountain. The wind was blowing violently; and about 6 P.M., we reached the place of our morning's descent; but the sun was down before we arrived at the cave.

On the 2d, we set out on our return down the mountain: Mr. Brackenridge and myself proceeding at first Northward; and following the margin of the forest, until we rejoined the direct route, and re-entered the warm region below.

CHARACTER OF THE VEGETABLE GROWTH. The Hawaiian Islands, as will be perceived, contain only two botanical regions. And notwithstanding the great height of the mountains, the congested alpine phase of vegetable growth does not occur upon them. The most characteristic plants of the Mountain-region, are the arborescent Compositæ, all of them *Dubautias*, the *Argyroxiphiums*, and the woody-stemmed strap-leaved *Geraniums*. It is also principally in the Mountain-region, that American and Australian analogies occur, as already intimated.

The following plants were found growing in THE MOUNTAIN-REGION OF THE HAWAIIAN ISLANDS; its regular limit being at the elevation of 6700 feet:

Ranunculus (No. 1); flowers smaller than in R. acris. Abounding in the pastoral district on Mauna Kea, as far as the elevation on 10,000 feet; and extending downwards in the bed of a stream nearly through the forest. On Mauna Haleakala, growing at the elevation of 8000 feet, but rare. Growing also on the tabular summit of Tauai.*

——— (No. 2); "distinct," according to Mr. Brackenridge; the flowers smaller, and the leaves more entire. In the mountain-defile across West Maui.

Cardamine (No. 2; compare C. sarmentosa, Metia to the Feejee Islands); segments of the leaves broad, petioled. Abounding in the upper portion of the forest on Mauna Kea, but not extending beyond the margin into the pastoral district.

Viola nov. sp., (No. 2). Normal; like V. palustris, but having rounder, almost reniform leaves; flowers pale blue. In a distinct bog on the tabular summit of Tauai, at the elevation of about 4000 feet.

Drosera nov. sp., (No. 1); near D. longifolia. In a bog on the tabular summit of Tauai, at the elevation about 4000 feet.

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* Brassica oleracea, (bis lower down, Taheiti, Tongatabu, United States, and No. 1 Europe); the cabbage. Naturalized around the frequented cave on Mauna Haleakala, at the elevation of "8090 feet."

Oxalis (No. 2; O. corniculata of some writers); leaflets small, bilobed, hairy. North flank of Mauna Kaala, Rich and Brackenridge. And apparently the same species, abundantly naturalized in the pastoral district on Mauna Kea as far as the elevation of 8000 feet.

Silene nov. sp., (No. 1). Shrubby, green-flowered. On Mauna Roa, at the elevation of 6500 feet. In the pastoral district on Mauna Kea, to the elevation of 11,200 feet; the flowers large, green, the petals notched or emarginate.

——— nov. sp., (No. 2). Shrubby at base; leaves larger than in Mauna Roa sp., lanceolate; a terminal naked corymb of white flowers. On the tabular summit of Tauai.

Nov. gen. Silenoid, (No. 3). A shrub with linear, almost Ericoid or heath-like leaves. In the environs of the Great Crater. On Mauna Haleakala, at the elevation of 5500 feet, but rare.

Nov. gen. Geranioid, (No. 1). A shrub, two to three feet high, with something of the habit of Aronia; stems clustered, a third of an inch in diameter, and leafy only at the summit; under surface of the leaves silvery; flowers white. On Mauna Roa, above the elevation of 6100 feet, not abundant. In ripening, the elastic base of the stigmas curves upward bearing the attached carpel; agreeing in this respect with Geranium, and according to Mr. Brackenridge, "differing from Pelargonium."

———; seeming distinct; the upper surface of the leaves silvery. In the pastoral district on Mauna Kea, to the elevation of 11,000 feet. And on Mauna Haleakala, from the elevation of 5500 to 9500 feet.

———; like the first sp., but perhaps distinct; the leaves very small. On the tabular summit of Tauai.

——— nov. sp., (No. 2). A shrub, three to six feet high; leaves ovate, serrate, entire at base; flowers regular, and in all instances white with purple veins. Frequent on Mauna Haleakala, commencing at 5500 feet.

——— (No. 3). A beautiful species, with showy red flowers turning to dark purple; sepals overlapping; petals somewhat cucullate, the upper ones being longest, the reverse in this respect of Pelargonium. On Mauna Haleakala, from the elevation of 5500 to 6700 feet; usually a shrub, three to six feet high, but on the Northern flank becoming a tree fifteen feet high, with the trunk eight inches in diameter; (a section of a primary branch, given off about six feet from the ground, was brought away by Mr. Brackenridge). The same species was found by Mr. Rich on Hawaii, probably on the Western side of Mauna Roa.

Dodonæa (bis No. 1 lower down). On Mauna Roa, to the elevation of 6500 feet, the leaves lanceolate and the fruit large. On Mauna Haleakala, to the elevation of 8000 feet.

Edwardsia (No. 1); the "mamani" tree. Leaves pubescent on both sides. In the environs of the Great crater, somewhat rare; but commencing on the Leeward side at the elevation of 1000 feet, and extending to 6500 on Mauna Roa. In the pastoral district on Mauna Kea, becoming a tree, twenty feet high with the trunk eight to twelve inches in diameter; growing in an isolated or scattered manner as far as the elevation of 9500 feet. On Mauna Haleakala, occurring only as a shrub, and commencing at 6500 feet. Observed also, on the tabular summit of Tauai.

Daucus carota, (bis United States, Patagonia, Chili, New Zealand, Australia, and No. 1 Europe). Annual, or at least the root manifesting no tendency to become fleshy; habit of Torilis, stem branching. Naturalized in the pastoral district on Mauna Kea, and growing from the elevation of 6700 to 8500 feet. Found also on Hawaii by Mr. Rich. Introduced by colonial Whites.

Lathyrus? (No. 1); but no flowers. Stems long, rambling, tangled among shrubs; leaflets large, as in L. Americanus; stipules many-toothed; teeth long, subulate. In the forest on Mauna Kea, at the elevation of 3500 feet.

Acacia heterophylla, (bis No. 3 lower down). The principal tree at the upper margin of the forest on Mauna Kea, and extending into the pastoral district in the form of scattered bushes as far as the elevation of 7200 feet. On Mauna Haleakala, commencing at the elevation of 2000 feet.

Rubus (bis No. 2 lower down). Extending in the pastoral district on Mauna Kea to the elevation of 9500 feet. On Mauna Haleakala, from the elevation of 3000 to 7200 feet.

——— (No. 3); "distinct," according to Mr. Brackenridge. Creeping, trifoliolate, pubescent. On the North flank of Mauna Haleakala, at the elevation of 6700 feet.

Fragaria (nov. sp., No. 1); compare F. Chilensis (of some writers). Leaves with long hairs, the under surface sericeous and whitish; "inflorescence on a very short stem;" no tendency to produce a fleshy berry. In somewhat moist places around the Great Crater, abundant; extending on Mauna Roa, as far as the elevation of 5000 feet. In the pastoral district on Mauna Kea, to the elevation of 8700 feet. And on Mauna Haleakala, from the elevation of 3000 to 5500 feet.

Acæna (No. 1). Low; the stem only four or five inches; at base, crowded small leaves with broad sheaths. In a bog on the tabular summit of Tauai.

Lythrum (bis No. 1 lower down, and compare Peru). In the environs of the Great Crater. On Mauna Haleakala, from the elevation of 5500 to 6700 feet.

Metrosideros (bis No. 4 lower down). On Mauna Roa, as far at least as the elevation of 6500 feet; where only fifteen feet high, with the trunk eight inches in diameter. A woolly Metrosideros seen on Mauna Haleakala, at the elevation of 6700 feet.

——— (bis lower down). The variety or species with smooth fruit, growing in company with the preceding on Mauna Roa, to the elevation of 6500 feet; but rare.

Sanicula? (No. 1); leaves mostly radical, deeply divided; flowers small, in capit.; "fruit rough. On Mauna Roa," Brackenridge. On Mauna Haleakala, frequent from the elevation of 3000 to 5500 feet, the flowers yellow.

Gen. Pastinacoid, (No. 1). Leaves pinnate; the segments broad-ovate, inequal at base, sharply-serrate, acute, the lowest in some instances divided; support of fruit a third of an inch in length. Along the Leeward verge of the tabular summit of Tauai, at the elevation of 3700 feet.

Gunnera (No. 1); very large leaves. Clinging to the face of precipitous rock, at the Northern termination of the tabular summit of Tauai, and in the mountain-defile across West Maui; or from the elevation of 2500 to 4000 feet.

Nertera (No. 1; compare No. 4 Terra del Fuego). Seeming properly a mountain plant, though not extending above the limit of the forest. On the mountains behind Honolulu; and to the elevation of 5500 feet in the forest on Mauna Kea.

Cænotus Canadensis? (bis lower down). Naturalized in the pastoral region on Mauna Kea; probably introduced by colonial Whites. Apparently the same species growing on Mauna Haleakala, at the elevation of 5500 feet.

Gnaphalium (luteo-album?; compare Peruvian Andes, New Zealand, Australia, and Europe). Annual; leaves linear, the under surface white; flowers yellowish. On

Gen. Coffeac. with Ericoid foliage, (No. 1). Leaves opposite and fasciculate; calyx 4-fid; corolla inconspicuous; stigmas very long; berry black, glutinous, containing two seeds, and in one instance (unless the reference belongs to the next plant), observed double as in Mitchella. Abounding around the Great Crater, where the berries are covered with threads of the capillary obsidian; occurring also on Mauna Roa, to the elevation of 6700 feet. On Mauna Kea, to the elevation of 10,500 feet. And on Mauna Haleakala, from the elevation of 3500 to 5500 feet, but somewhat rare.

Gen. Coffeac. ? dioecious?, (bis No. 2 lower down). On Mauna Roa, to the elevation of 6500 feet; where it is a shrub, presenting nothing of the gnarled mountain aspect, the fruit orange-colored and not beaked. On Mauna Kea, twelve feet high at the elevation of 8700 feet, and extending to the elevation of 10,500 feet. On Mauna Haleakala, from the elevation of 5500 to 9500 feet, where it continues frequent.

Dubautia (No. 5). A shrub, six feet high; leaves verticillate in threes, entire, 3-ribbed; involucral scales uniserial. Upper base of Mauna Roa, at the elevation of about 4000 feet. Apparently the same species, a multicaul shrub two to six feet high, on Mauna Haleakala from the elevation of 5500 to 9500 feet, where it continues frequent.

———; perhaps not distinct from the last; the leaves opposite, not verticillate; the stems more hairy. In the pastoral district on Mauna Kea.

——— (No. 6). Two feet high; resembling (No. 5), but the leaves denticulate and broader; flowers small. "Leeward side of the Great Crater, commencing at the elevation of 1200 feet," Brackenridge.

——— nov. sp. (No. 7). Protea-like; cinereous; the leaves verticillate in threes, broad, with short pubescence; the young shoots also pubescent. On Mauna Kea, from the elevation of 9500 to 11,500 feet; at the first-named limit, sometimes a tree, twenty feet high with the trunk nine inches in diameter, the branches overhanging, the leaves pubescent trinerved and pointed, and the flowers small.

——— (No. 8). A small tree, twenty feet high, with the trunk a foot in diameter; the young shoots pubescent; leaves narrow-ovate, obtuse, 3-5-nerved; the florets more numerous. Growing in company, or rather, alternating with the scattered Edwardsia trees in the pastoral district on Mauna Kea.

——— (No. 9); leaves broad, green on both sides; flowers small. In the pastoral district on Mauna Kea.

——— nov. sp., (No. 10); leaves broad, glutinous. On the summit of the dividing ridge in the crater-like cleft of Mauna Haleakala, at the elevation of about 7500 feet.— In general, the whorled species of Dubautia seemed more peculiarly to belong to the Mountain-region.

Dubautioid (No. 1); bayonet-shaped leaves, decussate, stellate or verticillate in fives, the under surface green. On Mauna Roa, from the elevation of 6400 to 9100 feet. (No specimens).

Stevia? (No. 1). One to two feet, decumbent; leaves alternate, entire, or sometimes with a few coarse serratures; the flowering stem nearly destitute of leaves. Frequent in the

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Mauna Roa, at the elevation of about 5600 feet. Apparently the same species, growing on Mauna Haleakala at the elevation of 7000 feet; and on the barren Leeward verge of the table-land of Tauai. Introduced by colonial Whites.

environs of the Great Crater. Growing also on Mauna Haleakala, from the elevation of 3000 to 5500 feet.

(Tetramolopium?, No. 1); Aster-like, or compare Erigeron?. Low, resinous; leaves clavate, and crowded. On Mauna Roa, from the elevation of 7000 to 9300 feet. On Mauna Kea, from the elevation of 9000 to 11,000 feet. And apparently the same species, on Mauna Haleakala, from the elevation of 6500 to 9500 feet.

(———); seeming larger and smoother than the last. Found by Mr. Rich on Hawaii, probably on the Western side of Mauna Roa.

(———?, No. 2); a second Erica-leaved Compos. On Mauna Kea, at the elevation of 11,000 feet.

Gnaphalium (No. 2); like G. luteo-album, but perennial. Large and branching; leaves woolly on both sides; flowers yellow. On Mauna Kea, from the elevation of 9000 to 11,200 feet, observed growing in two or three places. Growing also, on Mauna Haleakala, above the elevation of 7500 feet.

Argyroxiphium (No. 1). Having something of the habit of Yucca, but the leaves shorter, closely imbricate, and silvery; the flowers in the distance not unlike those of a Cereus. On Mauna Roa, commencing at the elevation of 6300 feet. Growing on Mauna Kea, from the elevation of 10,000 to 12,000 feet. On Mauna Haleakala, commencing at the elevation of 9000 feet, and extending to within thirty feet of the summit.

——— nov. sp., (No. 2); same habit with the preceding, but the leaves green and smooth. On Mauna Haleakala, from the elevation of 5500 to 9500 feet.

——— nov. sp., (No. 3). Stem simple, six to fourteen feet high; the leaves not crowded, distinctly verticillate, or even united for an inch or more, and smooth, with a white woolly margin; involucre also seeming monophyllous. Along the Leeward verge of the tabular summit of Tauai, at the elevation of about 3700 feet.

Artemisia (No. 1); white toment. On the summit of the dividing ridge in the crater-like cleft of Mauna Haleakala, at the elevation of 7500 feet, Brackenridge. And apparently the same species, in the mountain-defile across West Maui.

———; perhaps the same species, though less sericeous. On the Southern flank of Mauna Kaala. And again less white, on Tauai.

Vaccinium (No. 3); glaucous; leaves decussate in the living plant; berry elongate, blue. On Mauna Roa, from the elevation of 9000 to 11,000 feet. On Mauna Kea, to the elevation of 11,500 feet. On Mauna Haleakala, from the elevation of 8500 to 10,200 feet, to within a few yards horizontally of the summit.

——— (No. 4). A low shrub; leaves mostly serrate; berries like diminutive apples, and in color red and yellowish. Seen only in the environs of the Great Crater and on Mauna Roa, abounding, and growing from the elevation of 1000 feet to 6500; at this height on the 19th of December, only in flower, while lower down on the previous day, only in fruit.

——— (No. 5); compare the last, but the leaves seeming more deeply serrate; flowers short. In the pastoral district on Mauna Kea, at the elevation of 9000 feet. The low

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Sonchus oleraceus, (bis lower down, and Taheiti, United States, Patagonia, the Peruvian Mountain-region, Auckland Island, New Zealand, and No. 2 Europe). Naturalized in the pastoral district on Mauna Kea, to the elevation of 8000 feet; and on Mauna Haleakala, to the elevation of 6000 feet. Introduced by colonial Whites.

crinited sp. of Mauna Kea, among grasses, and in other situations on Mauna Haleakala, at the elevation of 7500 feet.

——— (No. 6). A tall shrub; berries red, astringent. In woods between the Great Crater and Mauna Roa, at the elevation of 4000 feet.

——— nov. sp., (No. 7); a well-marked species; leaves lanceolate, pointed, sinuately serrate; no fr. On the tabular summit of Tauai. Apparently the same species, Berberis-leaved, growing on the North flank of Mauna Haleakala, at the elevation of 6700 feet. The Berberis-leaved species growing also on the mountains behind Honolulu.

Cyathodes (No. 3); a shrub. In the forest on Mauna Kea, sometimes fifteen feet high, and even epidendric on the trunks and branches of trees; extending in a more humble form into the pastoral district. On Mauna Haleakala, three to six feet high, and frequent from the elevation of 2000 to 5500 feet. Growing also on the mountains behind Honolulu; and perhaps the same species, but low, in bogs on the tabular summit of Tauai.

——— (No. 4); leaves narrower, and more pointed; berries mostly red, often permanently invested with the corolla; the style persistent. On Mauna Kea, from the elevation of 8700 to 11,000 feet. Abundant at the elevation of 9500 feet on Mauna Haleakala.

——— (No. 5). A shrub, two to three feet high. Growing chiefly in the environs of the Great Crater and on Mauna Roa; where it is abundant, ceasing at the elevation of 9100 feet. Apparently the same species, at the elevation of 11,500 feet on Mauna Kea.

Gen. Lubinioid, (bis No. 1 lower down). On the North flank of Mauna Haleakala, to the elevation of 6700 feet; the flowers dark purple, and the corolla 6-cleft.

Myoporum (bis No. 1 lower down). Extending into the pastoral district on Mauna Kea, to the elevation of 7200 feet.

Audibertia? (No. 1). Habit of Salvia; tufted; leaves large, hastate; calyx two-lipped, the teeth nearly equal; flowers purple and ornamental, the corolla tubular. On Mauna Haleakala, from the elevation of 3000 to 5700 feet.

Phyllostegia (No. 12). Upright, smooth; leaves ovate; flowers pale purple. In the pastoral district on Mauna Kea, to the elevation of 9700 feet.

——— (No. 13); pubescent; flowers small, white. On Mauna Haleakala, at the elevation of about 5500 feet.

Nov. gen. near Phyllostegia, (No. 1). Full of branches, climbing; leaves small, smooth, pointed; flowers small and green, the lower lip of the corolla not enlarged. Commencing in the forest on Mauna Kea at the elevation of 5000 feet, and extending to 9500 in the pastoral district. On Mauna Haleakala, from the elevation of 5500 to 9500 feet.

——— (No. 2); flowers larger, the lower lip very slightly enlarged; carpels fleshy, berry-like. On Mauna Haleakala, at the elevation of 6700 feet. Apparently the same species, at the saw-mill near Hilo, at the elevation of 1500 to 2000 feet.

——— (No. 3); belonging to the genus with small lower lip. Leaves lanceolate, crenulate. Found by Mr. Rich "on Hawaii," probably on the Western side of Mauna Roa.

Solanum nigrum? (bis lower down, and Taheiti to the Feejee Islands, and compare No. 28 California, Chili, and Peru). Naturalized in the pastoral region on Mauna Kea, to the elevation of 9000 feet.

Plantago (No. 3). Normal; near P. lanceolata, but taller and stouter; the leaves broader, rather upright, with about ten ribs. In the environs of the Great Crater, to the elevation of 6500 feet on Mauna Roa. Apparently the same species, but smaller, abounding in the pastoral district on Mauna Kea to the elevation of 8000 feet.

——— (No. 4). Normal; leaves broad, the under surface pubescent. On Mauna Haleakala to the elevation of 7500 feet. Apparently the same species, on the tabular summit of Tauai, the leaves hairy beneath.

——— nov. sp., (No. 5). Stemless, broad-leaved. Growing in a bog, on the tabular summit of Tauai.

Chenopodium (bis No. 1 lower down). In the pastoral district on Mauna Kea, to the elevation of 9000 feet, the stem shrubby and sometimes two inches in diameter. On Mauna Haleakala, at the elevation of 6000 feet.

Rumex nov. sp., (No. 2). Decumbent, or in other instances rambling among the branches of shrubs; leaves oblong, rather small, and of uniform size; alæ of the fruit entire, devoid of granules. In the environs of the Great Crater, to the elevation of 7500 feet on Mauna Roa. In the upper portion of the forest on Mauna Kea, often growing on the trunks and branches of trees; and in the pastoral district, extending to the elevation of 7200 feet. Frequent on Mauna Haleakala, from the elevation of 1000 to 8100 feet.

Daphne (bis No. 6 lower down). On Mauna Roa, to the elevation of 6700 feet.

Santalum (bis No. 4 lower down). From the elevation of 5000 to that of 6500 feet on Mauna Roa, where it becomes rare. On Mauna Haleakala, commencing at the elevation of 6000 feet, and by no means rare on the open and barren parts of the mountain to about the same limit of 6500 feet.

Exocarpus (No. 1). Frequent on Mauna Roa from the elevation of 6000 to 6500 feet, but only in the form of a low semi-decumbent branching shrub, devoid of true leaves. On the mountains behind Honolulu, arborescent, smooth, and often provided with broad leaves.

Parietaria? (bis No. 1 lower down). To the elevation of about 7000 feet in the pastoral district on Mauna Kea.

Sisyrinchium (No. 1); yellow-flowered. Frequent in the environs of the Great Crater, and in the pastoral district on Mauna Kea to the elevation of 8000 feet. On Mauna Haleakala, from the elevation of 3000 to 5500 feet.

Dianella (bis No. 1 lower down, and Taheiti to the Feejee Islands). Environs of the Great Crater, and on Mauna Roa to the elevation of 6500 feet; where it becomes rare. On Mauna Haleakala, to the elevation of 6700 feet.

Smilax (bis No. 4 lower down). Extending in sheltered hollows to the elevation of 6500 feet on Mauna Roa.

Hamelinia (bis lower down), but leaves seeming narrower. In cracks of the lava-surface

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Briza media, (bis United States, Australia, and No. 1 Europe). Found by Mr. Rich on Hawaii, probably on the Western side of Mauna Roa. Introduced by colonial Whites.

Poa annua, (bis Oregon, United States, and New Zealand, and compare Peruvian and Chilian Andes). Bank of stream below the upper margin of the forest on Mauna Kea. Introduced by colonial Whites.

on Mauna Roa to the elevation of 6500 feet; where it becomes rare. On Mauna Haleakala, to the elevation of 6700 feet.

Juncus (No. 1); near one-flowered Fuegian species. Growing in large tufts; habit of Orcobolus; a single terminal flower. Abounding on Mauna Haleakala, at the elevation of 7300 feet. Growing also on the tabular summit of Tauai.

Luzula (No. 1). Tall, one to three feet high; radical leaves hairy. Frequent in the environs of the Great Crater, but becoming rare at the elevation of 6500 feet on Mauna Roa. In the pastoral district on Mauna Kea extending to the elevation of 10,000 feet to within half a mile of Red Hill. On Mauna Haleakala, from the elevation of 3000 to 9500 feet.

———; possibly distinct. Growing on the tabular summit of Tauai.

Morelotia (No. 1). Six to ten inches high, growing in tufts. Frequent in the environs of the Great Crater, and on Mauna Roa to the elevation of at least 6700 feet. Growing also in the pastoral district on Mauna Kea. On Mauna Haleakala, commencing at the elevation of 6800 feet, where it is rare.

———; possibly distinct; seeming larger. On the "North flank of Mauna Kaala," Rich and Brackenridge.

Gen. Restioid, (No. 1). Stemmed; glaucous; leaves gladiate, or Iris-like. In the environs of the Great Crater; and according to Mr. Brackenridge, extending to the elevation of "6000 feet" on Mauna Roa.

——— (No. 2); Iris-leaved, largest. Environs of the Great Crater. This, or the preceding species, abounding on the North flank of Mauna Haleakala at the elevation of 6500 feet.

——— (No. 3); perhaps a third species; Iris-leaved, smallest. Between Hilo and the Great Crater, and extending to the elevation of 6500 feet on Mauna Roa; where it becomes rare.

Uncinia (No. 1). Large, growing in tufts. Along the upper margin of the forest on Mauna Kea, at the elevation of 6700 feet; rare. In the mountain-defile across West Maui; also rare.

Nov. gen. Caric., (No. 2; a congener of Feejeean sp. ?). Fascicles arising from sheaths one above the other as in Rhynchospora; spikes male at the apex, Uncinia-like, the beak of the caryopsis bifid, but no hooks. On the tabular summit of Tauai. Apparently the same species on Mauna Roa from the elevation of 6200 to 9500 feet, low, growing in tufts, the spikelets male at the apex, and the caryopsis beaked.

Carex (No. 1); resembling C. acuta, but more robust. On Mauna Roa, at the elevation of 5000 feet, and in a dry ravine at the elevation of 6300 feet; rare. On Mauna Haleakala, at the elevation of 5500 feet.

———; seeming distinct from Mauna Roa sp.; the spikes more distant; the male spike solitary. Along the upper margin of the forest on Mauna Kea.

——— nov. sp., (No. 2); like C. acuta, but three feet high, and nine rigid fertile spikes. Bank of stream in the upper portion of the forest on Mauna Kea, at the elevation of about 5500 feet.

——— (No. 3); near C. tenera. Growing in tufts, and abounding in the openings below the upper margin of the forest on Mauna Kea, and in the neighboring portion of the pastoral district; extending from the elevation of 6000 to 8800 feet. Said to be used by the natives in "dyeing bark-cloth or tapa."

Panicum (bis No. 5 lower down). Frequent in the pastoral district on Mauna Kea, to the elevation of 8000 feet.

——— nov. sp., (No. 8). Stems very short, hardly rising above the leaves; the leaves ciliate with long bristles. In a bog, on the tabular summit of Tauai.

Nov. gen. Poac., (No. 1); calyx-glumes as long as the spikelet, which consists of about eight florets; the florets scarious on the margin, and pointed. On Mauna Roa, from the elevation of 3800 to 5000 feet. On Mauna Haleakala, from the elevation of 2500 to 5500 feet.

——— (No. 2); perhaps not distinct, but apparently leafy at base, and tufts of hairs at the mouth of the sheaths; spikelets of three to four florets; habit of Agrostis. In the environs of the Great Crater.

Agrostis (No. 1); awned; the panicle coarctate. On Mauna Roa, from the elevation of 9500 to 11,800 feet, "to within a mile of the 2d Station," Brackenridge. On Mauna Kea, at the elevation of 13,000 feet. On Mauna Haleakala, at the elevation of 9500 feet, but the leaves seeming narrower.

——— (No. 2); resembling the last, but no awns; leaves narrow, almost capillary; panicle coarctate. Growing in tufts; at the elevation of 5000 to 6500 feet on Mauna Roa. In the pastoral district on Mauna Kea, to the elevation of 9000 feet.

——— (No. 3); apparently a third species. Same habit, but taller, and the florets larger; awned; and the panicle coarctate. On Mauna Roa, from the elevation of 5000 to 6700 feet; in a second specimen, the awns not made out.

(Calamagrostis?, No. 1; recorded as) Arundoid?; the corolla awned, and hairs at the base. Along the upper margin of the forest on the North flank of Mauna Haleakala, at the elevation of 6700 feet.

Aira (No. 1); compare A. flexuosa, but the awns very short or wanting; leaves mostly radical, upright, and closely involute. On Mauna Roa, at the elevation of 6500 feet; rare.

——— (No. 2); three feet high, growing in tufts. In the pastoral district on Mauna Kea, from the elevation of 8000 to 10,000 feet. On Mauna Haleakala, from the elevation of 8000 to 9500 feet.—And apparently the same species, the leaves narrow, at the base of Mauna Kea near Hilo.

Trisetum (No. 1); like T. subspicatum, but much larger; growing in tufts. On Mauna Roa, from the elevation of 5000 to at least 6700 feet. On Mauna Kea, from the elevation of 8000 to 13,000 feet. On Mauna Haleakala, from the elevation of 5500 feet to 10,200, to within a few yards horizontally of the summit.

Greenioid? (No. 1). Multicaul; panicle coarctate; corolla or seed, long-awned. Frequent in the environs of the Great Crater.

Lycopodium (No. 15); like L. clavatum. Creeping; spikes three together. In cracks of the lava-surface, at the elevation of 6500 feet on Mauna Roa; rare. Apparently the same species on Mauna Kea, at the elevation of 9500 feet; on Mauna Haleakala, to the elevation of 8000 feet; and specimens bearing four spikes, found by Rich and Brackenridge on the "North flank of Mauna Kaala."

——— nov. sp., (No. 16); habit of N. Amer. sp.; fruit sessile. On the face of a rock on the North flank of Mauna Haleakala, at the elevation of about 7700 feet.

——— nov. sp., (No. 17); habit of the last; smaller leaves. On the face of the same rock on the North flank of Mauna Haleakala, at the elevation of 7700 feet. Apparently the same species, growing on the tabular summit of Tauai.

Ophioglossum (compare No. 2 Samoa). Normal; and like O. vulgatum of Europe. On Mauna Haleakala; and on the tabular summit of Tauai.

Acrostichum (No. 12); frond lanceolate, paleaceous. On Mauna Roa, growing in cracks

of the lava-surface at the elevation of 6500 feet. On Mauna Haleakala, at the elevation of 6700 feet.

Botrychium (No. 1); near B. fumarioides, but taller, and a short stem. "In deep woods in the district of Puna," rare, Brackenridge. Growing also, on the tabular summit of Tauai.

Polypodium (No. 24); like P. vulgare, but larger. Frequent in the environs of the Great Crater, but becoming more rare on Mauna Roa; though extending from the elevation of 3000 to 9300 feet. On the "North flank of Mauna Kaala, at the elevation of fifteen hundred feet," Rich and Brackenridge. And on the tabular summit of Tauai.

——— (No. 25); frond narrow, lanceolate, rigid; sori in two rows, large. On trunks of trees in the environs of the Great Crater; and on the ground, in a cave at the elevation of 6200 feet on Mauna Roa. On Mauna Haleakala, to the elevation of 8000 feet.

Pteris (bis No. 1 lower down, and compare Taheiti to the Feejee Islands, and) P. aquilina. At the elevation of 6500 feet on Mauna Roa, very rare. On Mauna Kea, to the elevation of 11,200 feet. And on Mauna Haleakala, from the elevation of 2000 to 9500 feet.

——— (No. 16); near P. palmata and P. geraniifolia, but more divided. At the upper base of Mauna Roa. And apparently the same species in the pastoral district on Mauna Kea.

——— (No. 17); referred by Mr. Brackenridge to "P. ternifolia of the Peruvian Andes." In the environs of the Great Crater and on Mauna Roa, from the elevation of 1500 to 10,000 feet. On Mauna Kea, to the elevation of 11,500 feet. On Mauna Haleakala, commencing at the elevation of 3500 feet. Growing also on the tabular summit of Tauai.

Aspidium (bis No. 10 lower down). Frequent in the inferior portion of the pastoral district on Mauna Kea. The sp. with rectangular subdivisions growing also on the North flank of Mauna Haleakala, as far as the elevation of 7200 feet.

——— (bis No. 12 lower down). The paleaceous sp. of Mauna Kea growing on the North flank of Mauna Haleakala, as far as the elevation of 7200 feet.

——— (No. 17); rachis paleaceous; frond narrow, bipinn., the pinn. dentate. On Mauna Kea, along the upper limit of the Edwardsia trees, at the elevation of about 9500 feet; rare.

——— nov. sp., (No. 18); frond bipinn.; the segments quadrangular, toothed at apex; paleæ on the rachis; no fructification. In the pastoral district on Mauna Kea, the precise locality not recollected.

Woodsioid (No. 1). Small, eight inches high; frond tenderly herbaceous, bipinn., narrow; indusium half-adhering, tent-shaped or with a central apex. On Mauna Kea, at the elevation of 9500 feet, rare. Apparently the same species, on Mauna Haleakala; on the Mauna Kaala ridge; and (recorded as) Asplenium with almost Woodsia habit, on Mauna Roa, from the elevation of 6100 to 9500 feet, growing in cracks of the lava-surface.

——— (No. 2). Fronds bipinn., four to six inches high; often only one or two inches high and simply pinn. and lobed. On the face of a rock on the North flank of Mauna Haleakala, at the elevation of 7700 feet.

Asplenium? (No. 35); habit of Trichomanes; sori several. On Mauna Roa, from the elevation of 6100 to 9500 feet. On Mauna Kea, to the elevation of 12,000 feet. On Mauna Haleakala, from the elevation of 3500 to 10,000 feet. Perhaps the same species,

but the sori seeming fewer and larger, growing throughout the forest on Mauna Kea, from the saw-mill to the upper margin, or from the elevation of 2000 to 6700 feet.

——— (No. 36); like A. ruta-muraria, but larger; frond tripinn., the pinn. dentate. On Mauna Roa, at the elevation of 12,200 feet, "a quarter of a mile above the 2d Station," Brackenridge. On Mauna Haleakala, to the elevation of 9500 feet. On the Mauna Kaala ridge. And on the tabular summit of Tauai.

Jungermannia. Various species observed, growing at the elevation of 6700 feet on the North flank of Mauna Haleakala.

Hypnum (No. 10); near H. plumosum, but more dist. branch.; ornamental. In a cave on Mauna Roa, at the elevation of about 9200 feet.

Anyctangioid (No. 5); seeming a congener of No. 2, but having a fringe of about twelve teeth in a single series; leaves narrower. In the pastoral district on Mauna Kea.

Bryum? (bis lower down). On Mauna Haleakala, at the elevation of 10,000 feet. Perhaps the same species, in the pastoral district on Mauna Kea, tenderly herbaceous, green, and silky.

Gen. Bryoid, (No. 1); full of short branches at right angles. In dense tufts, a foot or more in diameter, often covering holes and crevices in the immediate neighborhood of the Great Crater. Growing also in the pastoral district on Mauna Kea, the leaves terminating in a white bristly point; and lower down, at the elevation of only 2000 feet, the fringe-teeth not made out. Also on Mauna Haleakala, at the elevation of 6700 feet.

———? (No. 2); seeming distinct Stems tall; the leaves curled; fringe-teeth about twelve. In the pastoral district on Mauna Kea.

Orthotrichum? (No. 3). In a cave on Mauna Roa, at the elevation of about 9200 feet. Perhaps, the "moss" found by Capt. Wilkes in a slight steam-crevice on the summit of Mauna Roa.—Three species of Mosses were growing on Mauna Kea at the elevation of 11,000 feet.

Encalypta (No. 1). Frequent on the trunks of the Edwardsia trees in the pastoral district on Mauna Kea.

Tortula? (No. 1). On the North flank of Mauna Haleakala.

Parmelia? (bis No. 6 lower down); Sticta-like, with a yellow margin. On Mauna Haleakala, to the elevation of 8000 feet.

——— (No. 7); near P. parietina. On Mauna Kea, at the elevation of 11,000 feet. And near the summit of Mauna Haleakala.

Usnea (bis lower down). In the pastoral district on Mauna Kea, to the elevation of 10,000 feet. On Mauna Haleakala, growing on bushes, at the elevation of 7500 feet.

Cenomyce rangiferina, (No. 4, bis United States and Terra del Fuego); the rein-deer lichen. Growing on the ground in the environs of the Great Crater, and frequent at the elevation of 6500 feet on Mauna Roa.

Endocarpus (No. 1); smaller and thinner than Gyrophora; exceedingly brittle, the under surface bristly. On Mauna Kea, at the elevation of 11,000 feet.

Lecanora? (No. 1); white; no fructification. On Mauna Kea, as far as the elevation of 11,500 feet.

———? (No. 2); Parmelia-like, but crustaceous. On the bark of Edwardsia trees?, in the pastoral district on Mauna Kea.

Lecidea geographica? (No. 1, bis alpine summits in New Hampshire, and in Terra del Fuego). On Mauna Kea, from the elevation of 11,000 to 12,000 feet. On Mauna Haleakala, at the elevation of 10,000 feet.

In regard to the two preceding Lists of Hawaiian plants, it should be observed: that the revision in my Journal was discontinued after the Labiatæ in the first List. I had become weary of registering facts; and did not write any more descriptions of general vegetable growth. The concluding portion of the first Hawaiian List, and the entire second List, are given therefore from my memorandum-books and original rough notes.

The Vincennes arrived at Lahaina on the 6th. On the 11th, two slight shocks of an *earthquake* were experienced; on shore, as well as in the ship; where I happened to be at the time, but did not perceive them.—On the 17th, the ship sailed; and on the 18th, arrived at Honolulu on Oahu; where we remained, until our departure for Northwest America in the evening of the 5th of April.

Returning some months later from the American coast, the Vincennes made a SECOND VISIT to the Hawaiian Islands: reaching their Latitude on the 10th of November; gaining sight of Maui on the 16th, passing close along Molokai, and on the 17th arriving at Honolulu: remaining there until our final departure from the Group, on the 27th.

8. THE LADRONE ISLAND-REGION.

In continuing Westward, the Vincennes proceeded from point to point, deviating from the direct course to visit the positions of supposed reefs and islets; yet keeping chiefly before the wind, the rolling being heavier perhaps than in any other portion of our voyage.

On the 8th of December, we crossed the Longitude of 180°. The day was therefore, by a special order, called "Thursday the 9th;" the Reckoning in most of the islands and countries beyond, having been derived by sailing Eastward from the Atlantic.

On the 20th, we reached Wake's coral-islands; situated in "N. Lat. 19° 11′ and E. Long. 166° 31′," and already described.

On the 29th, after having traversed an immense tract of ocean, the Vincennes arrived in sight of GRIGAN, one of the Ladrone Islands. A single pyramidal mountain, "three miles in diameter" at base, rising evenly and rather steeply out of the sea, with the summit concealed in clouds. The elevation therefore can hardly be less than two thousand feet; but the ship did not at any time approach nearer than "fifteen miles." For the first time in this passage across the

whole width of the Pacific, the wind came out adverse; bringing thick weather, and more or less rain throughout the greater part of the day.

On the morning of the 30th, ASSUMPTION was in sight; another conical or pyramidal mountain, similar in outline, and also having its summit concealed in clouds; but clearing for a few moments, a "crater" was seen by Mr. Dana and others; and a "resemblance to Stromboli" was also remarked. The elevation was estimated at "two thousand" feet: but the ship kept at too great a distance for trees at any time to be distinguished.

Some rocks, called the "Mangs," were reported in sight from aloft; but did not become visible from the deck. Being mere projecting points, they indicated, that we had passed the limit of extensive coral development, of wide-encircling coral-reefs.

The *monsoons* are said to extend to the Ladrone Islands. So far as our own experience goes, we here lost the regular trade-wind; and were afterwards sometimes baffled; but in general, were able to hold our course Westward, as will appear by the following incidental notices:

The morning of the 31st was calm, with rather heavy rolling; but in the course of the day, there was much wind, the sky being overcast.

On the 1st of January, 1842, the wind was Southerly, and the ship was driven to the Northward of her course. The surface of the ocean rough, and at midnight much rain.

On the 2d, the wind came from the Northward, boisterous, and unexpectedly cool; so that many on board put on woollen clothes. The sky overcast much of the day.

On the 3d, the wind continued from the Northward, and still cool. The ship keeping close to the wind, and sailing rapidly.

On the 4th, the weather was more pleasant, and the surface of the ocean smoother. At night, a little cool, and the ship most of the time lying-by.

On the 5th, the weather was pleasant again. In the evening, a little cool as before.

On the 6th, the weather was warmer, and the wind lighter.

On the 7th, there was a little more wind; towards evening, coming from the South; the weather continuing warm.

THE EAST INDIAN REGIONS.

9. The Chinese East Indian Region.

On the morning of the 8th, the Vincennes reached the Bashee Islands; a separate cluster, a short distance from the Northern extreme of Luzon; all of them small, yet seeming too much broken and irregular to be mere outlying fragments of the main land. One of these islands was cloud-capped at its Eastern end: the others, not uniformly high, contained mountains of perhaps a thousand feet in elevation: "Goat Island" being comparatively low, and bordered with perpendicular cliffs. We passed within about four miles of the nearest island, the surf being plainly visible; the land, as throughout the Group, seeming barren and unwooded; its general brownish-green color varied only by the shadows of the numerous ridges, by patches apparently of fragments of rock on steep broken acclivities; with perhaps, bushes growing on these patches, and in the bottom of one or two ravines.

On the 9th, the Vincennes having rounded the Northwest angle of Luzon, was sailing Southward along the coast; the weather cloudy, with a fair breeze.—On the 10th, the breeze moderated, and the weather became more clear: and at 2 P.M., the land was in sight, for the most part high and mountainous, with rounded eminences and gentle slopes, imparting a continental rather than an insular aspect. Two of these eminences, situated some seventy miles North of Manila, were cloud-capped, and seemed as much as three or four thousand feet in elevation. The face of the country was more California-like than I expected to have seen in the East Indies; the frequent openings presenting the same pale-brown tint, and the scattered trees having very little fresh luxuriance; but besides more frequently forming woods, they had not the dark foliage of the California cypress. We

were near enough to distinguish a margin of low land in front, with a church at the water's edge; and some small vessels at anchor were reported.

Towards sunset on the 11th, we were approaching the entrance to the Bay: marked on the North side by the broad rounded mountain of Mariveles, three or four thousand feet in elevation; its slopes, though gradual, being more broken than in the Hawaiian volcanoes. In our progress South along the coast, the forest first became continuous on the flank of this mountain, and as we drew near, was observed to be freshly luxuriant. Yet there were no palms conspicuous in the forest in the distance; neither here, nor in any portion of the Interior we subsequently visited.

On the morning of the 13th, the Vincennes having sailed up the Bay, anchored among the shipping before the city of MANILA. In excursions in the environs, for three miles outwards in two different directions, I found the variety of plants much greater than among the Polynesian islands; but by no means approaching the profusion of species in Brazil.

On the 15th, I set out with others in two canoes for an excursion into the Interior: proceeding up a gently-flowing stream, until in the evening we reached the Lake. We here separated into two parties; Mr. Rich and Mr. Brackenridge proceeding towards the volcano in the other canoe.

On the 16th, our canoe arrived at Santa Cruz: and Mr. R. Sturgis, Lieut. Eld, and myself, proceeded with horses over a gradually-rising country, and at the end of "twelve miles" arrived at the Mission of Mayjayjay; about "a thousand feet above the sea." Thus far, we found the ground dry; but there were accompanying marks of excess of moisture in the climate. Beyond, on MOUNT BANAJAO, "the highest mountain on the island," there had been continual rain for several days; and the weather was represented as unpropitious for our proposed ascent.—We set out at 8 A.M. on the 17th, proceeding through an inhabited district, and across some rather extensive natural openings, affording pasturage, on which buffaloes in a few small herds were feeding. At the elevation of a thousand feet or so above the Mission, the forest became unbroken, and the ascent more steep; so that we were obliged to leave the horses, and proceed by the path on foot. Large trees proved rare; and among the variety of interesting plants in the moist, dripping forest, there were few showy flowers. At the

end of three hours, we reached the half-way station; and two hours more brought us to the summit of the mountain. We remained here a short time only; and then descended to the half-way station, where we passed the night. The component rock was nowhere exposed on the upper portion of the mountain, and very rarely lower down on the flanks; the only observed spot being in the bed of a water-course, where its character could not conveniently be ascertained; but there was nothing volcanic in its appearance.—Rain accompanied us all the way up and down, and throughout the night; and as soon as there was light enough on the morning of the 18th, or about 6 A.M., we again set out; and at the end of five hours, arrived at the Mission. In the afternoon, we returned to Santa Cruz; and at 9 P.M., re-embarked in our canoe.

Early in the morning of the 19th, we landed at BANOS: where there is a hot spring; a copious flow of water gushing out in several spots near the margin of the lake; but with the temperature not very near the boiling point. After an hour or more, which I spent in collecting plants in the vicinity, we again embarked; and proceeding through the lake and its outlet, reached the city before 8 P.M. in the evening.

On the 20th, I made a short excursion among the marshes in the environs of the city; and in the afternoon, returned on board the Vincennes.—At an early hour on the morning of the 21st, the Vincennes sailed from Manila; proceeding down the Bay.

CHARACTER AND COMPOSITION OF THE VEGETABLE GROWTH. As throughout the Southern Polynesian Groups: species of *Ficus* continued abundant; together with *Elatostemas; Cyrtandras; Freycinetias;* species of *Piper*, both shrubs and woody vines; and *Urticeous shrubs:* a *Cunoniaceous* plant being also present, notwithstanding the Northern Latitude.

On the other hand, in place of the natural openings being more or less fern-covered, and from the coarsely-herbaceous character of the grasses not well-adapted for pasturage, proximity to the continental unwooded districts of Tropical Asia was now manifest: creeping small-leaved *Desmodiums* replaced in the open ground the Trifoliums of Northern climates; humble *Justicias* and *Crotalarias* were intermingled; and the border very generally consisted of *Flemingia* bushes. In all situations, *Acanthaceæ* had become more abundant and various; while among woodland plants, species of *Calamus*, prominent climbing

palms, made their first appearance; together with *Pterospermums*, large and conspicuous forest-trees; *Astrapœa;* and other showy Tribes.

In the aspect of the vegetable growth, the most obvious peculiarity consisted in the *yellow-flowered Convolvuli;* which were frequent, and in various situations conspicuous, one of the species being even sub-aquatic. Another peculiar feature was remarked, in *climbing Elatostemas;* met with only here.

As compared with America, Lantanas were observed to be replaced by *Callicarpas.* Direct AMERICAN ANALOGIES were found in some very large-leaved *Urticeous shrubs,* resembling certain Brazilian species; and in the presence of a *Bauhinia,* and especially of *Begonias.*

NEGATIVE CHARACTERS. *Phaseoleæ* seemed less abundant than in Polynesia; and *Peperomias* were seldom met with; as also *Myrtaceæ,* which were decidedly and unexpectedly rare.

The following Tribes of plants were missing:

Ranunculaceæ,	(Moringaceæ),	(Santalaceæ),
the genus Gossypium,	the genus Metrosideros,	the genus Aleurites,
the genus Grewia,	(Alangieæ),	the genus Euphorbia,
Malpighiaceæ,	Lythraceæ,	the genus Broussonetia,
Symplocaceæ,	Lobelieæ,	Cycadaceæ,
Balsaminaceæ,	Epacridaceæ,	Iridaceæ,
the genus Euodia,	the genus Alyxia,	the genus Dianella,
Zygophyllaceæ,	Bignoniaceæ,	Melanthaceæ, and
the genus Spondias,	(Pedaliaceæ,	Juncaceæ.
the genus Inocarpus,	the genus Tectona),	
Pittosporaceæ,	Plantaginaceæ,	

The following plants were found growing in Southern Luzon:

Dillenia (No. 2); distinct from the Feejeean species. A tree, "twenty-five feet, or sometimes eighty to a hundred feet high;" leaves sinuately dentate. "On the mountains near Baños, at the elevation of 1200 feet," Brackenridge.*

Uvaria monilifera, Gaertn.? (No. 3). The fallen fruit found in the forest on Mount Banajao, at Mayjayjay.

Guatteria? (No. 1). A "shrub, twenty feet high;" leaves smooth; berries or drupes

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*Anona squamosa, (bis Taheiti to Tongatabu). The fruit spoken of at Manila, but not seen.

——— reticulata?. Fruit of medium size, flesh-colored, and of indifferent quality; the "scales" on the surface are more like cicatrices, as in certain Brazilian species.

Gen. Cleomac., (No. 1). Two feet high, herbaceous, trifoliolate; flowers small, yellow. "At Baños," Brackenridge.

separate. "On the mountains near Baños, at the elevation of 1200 feet," Rich and Brackenridge.

———? (No. 2); not before met with. Berries hardly becoming fleshy, dehiscent at apex; acuminate. "On the mountains near Baños," Brackenridge.

Gen. near Anona, (No. 1); flower single, opposite to a leaf; calyx 3-leaved; petals white. "On the mountains near Baños," Brackenridge.—Apparently the same species, having the leaves Myristica-like, a foot long by four inches wide, and smooth.

———? (No. 2); under surface of the leaves somewhat sericeous; no flowers nor fruit. In the environs of Manila.

Urena (No. 3); not before met with. "Eight feet high;" leaves angularly dentate and lobed, with the under surface pubescent. "On the mountains near Baños, at the elevation of 600 feet, rare," Brackenridge.

Gen. Hibiscus-like, (No. 1). Twenty-five feet high; no outer calyx; flowers in racemes; capsule splitting into from five to seven valves or segments. Along the river-bank, near Manila.

Paritium (bis No. 1 Metia to the Hawaiian and Feejee Islands, and compare Brazil and) P. tiliaceum; the leaves crenulate. In the environs of Manila; sub-maritime.

Abutilon (No. 1). At Baños, C. P.

Sida (No. 9); not before met with. Lax habit, creeping; leaves broad-cordate, indistinctly lobed. "At Baños," Brackenridge.

——— (No. 10); smooth; leaves lanceolate, obtuse. At Baños, C. P.

——— (No. 11); leaves ovate, obtuse, cuneate at base. On the basal portion of Mount Banajao.

——— (No. 12); not before met with. Leaves ovate, serrate; flowers glomerate; carpels smooth. At Baños, C. P.

———; seeming distinct from glomerate sp., the leaves narrower. "At Baños," Brackenridge.

(Helicteris ?, No. 1). Pterospermoid; leaves simple, ovate, inequal at base, long-pointed, the under surface white with close pubescence; smaller; two linear stipules at base. "At Baños," Brackenridge.

Pterospermum acerifolium, (No. 1). A tree, "seventy to eighty feet high. On the mountains near Baños, from the base to the elevation of 1200 feet," Brackenridge.

——— suberifolium, (No. 2). A "tree, twenty to thirty feet high. At Baños, growing along the margin of the Lake," Brackenridge.

Astrapæa (No. 1). "On the mountains near Baños," Brackenridge.

Gen. Thea-like, (No. 1). "A shrub;" fruit hairy, slightly trilobed. "On the mountains near Baños," Brackenridge.

(Drymaria, compare No. 1 Brazil); gen. near Stellaria; leaves subrotund. At Mayjayjay, growing on the basal portion of Mount Banajao.

Bixa Orellana, (bis Hawaiian Islands, and No. 1 Brazil and Peru); the arnotto. Cultivated; having been introduced by colonial Whites.

Urena (lobata; compare No. 2 Feejee Islands); leaves many-lobed. Frequent in open situations and in cultivated ground.

(Eriodendron anfractuosum); Bombax pentandrum of authors. Trunk and leaves smooth; flowers whitish, and not very showy. Planted within the limits of the city.

Gen. Olacac. (No. 1). A "pendent bush, twelve feet high;" leaves alternate; margin of the calyx nearly entire; petals three, with about three stamens attached to each. "At Baños," Brackenridge.

Gen. incert. (No. 1). A shrub; axillary spines; leaves alternate, caudate, having a long mucro or acumination. "On the mountains near Baños," Brackenridge.

Gen. Aurantiac.? (No. 1). Very spiny; leaves Carissa-like, but alternate. "On the mountains near Baños," Brackenridge.

(Limonia acidissima?, No. 1; recorded as) Limonioid?. Leaves pseudo-pinnate, and having black dots; a small red berry on a 5-cleft calyx. "At Baños, along the margin of the Lake," Brackenridge.

Gen. Sapindac.? (No. 1). Leaves 6-jugis, smooth, the leaflets entire, almost cordate at base; apparently a drupe, of the size of a small cherry. "At Baños," Brackenridge.

Sapindus (No. 3). "Twenty-five feet high;" flowers white. "On the mountains near Baños, at the elevation of 1200 feet," Brackenridge.

Gen. Meliac.? (No. 1). "A tree;" leaves 4-jugis; the leaflets penninerved, entire; no flowers. "At Baños," Brackenridge.

Leea; compare (No. 1) Feejee Islands. Met with about three miles back of Manila. No specimens.

———; seeming distinct from Manila sp. "On the mountains near Baños, at the elevation of 1400 feet," Brackenridge.

Cissus (No. 4). A vine; leaves quinate. On Mount Banajao, at the elevation of 3000 feet.

——— (No. 5); divided, and serrate leaves. At Baños, C. P.

——— (No. 6); leaves trifoliolate, and Rubus-like. "At Baños," Brackenridge.

Oxalis (No. 3); valves of the capsule snapping or projecting the seeds to a distance, as in Impatiens. At Baños, C. P.

Averrhoa? (No. 1). "A shrub;" leaves pinnate, the leaflets 4-jugis cum impari; flowers in lax pendent racemes. "At Baños," Brackenridge.

Nov. gen. Rutac.? (No. 9); compare Hawaiian genus of trees?; leaves elliptical; no flowers. "At Baños," Brackenridge.

Gen. incert, (No. 1). A "bush, fifteen feet high;" leaves alternate, penninerved, somewhat Flemingia-like; calyx 5-cleft; petals five, persistent; style single; berry containing two cells; compare Kiggelaria. "At Baños," Brackenridge.

Rhus? (No. 5); leaves trifoliolate, sinuately-dentate. On Mount Banajao.

Gen. Rhus-like, (No. 1); leaves pubescent, 14-jugis, the leaflets pinnatisect; no flowers. "On the mountains near Baños," Brackenridge.

Theobroma cacao. Arborescent, twenty feet high. Abundantly cultivated; having been introduced from America, by colonial Whites.

Corchorus (olitorius?, No. 1); fruit elongate. "At Baños," Brackenridge.

——— (capsularis?, No. 2); Abutilon-like; the fruit tubercular. "At Baños," Brackenridge.

Triumfetta (compare No. 3 Rio Janeiro). Frequent along roadsides, at Baños and elsewhere.

Citrus nov. sp., (No. 1, bis Samoa to Feejee Islands). "The Samoan species" seen by Mr. Rich.

Gen. incert. (No. 1); compare Legum.? "Creeping on trunks of trees;" leaves simple, cordate, hairy; stipules. "On the mountains near Baños, at the elevation of 2000 feet," Brackenridge.

Crotalaria, (No. 3); leaves simple, almost linear. On Mount Banajao.

Indigofera (No. 1). A shrub; softly pubescent. At Baños, C. P.

Desmodium (No. 7). Tall; the leaves simple. "At Baños," Brackenridge.

——— (No. 8); not before met with. Leaves trifoliolate, obovate, the under surface canescent. "At Baños," Brackenridge.

——— (No. 9); not before met with. Herbaceous; leaves trifoliolate, Glycine-like; flowers rose-colored; pod of two joints. "On the mountains near Baños," Brackenridge.

(Alysicarpus, No. 1); gen. near Desmodium. Creeping; small-leaved. With apparently other humble species, replacing the Trifoliums of Northern Climates in the open ground around Mount Banajao.

Flemingia (No. 1). A shrub, four feet high; pubescent; bracts membranous. In the environs of Manila; frequent.

——— (No. 2); a second species. Small leafy bracts. "At Baños," Brackenridge.

Gen. Galactioid, (No. 1). Large yellowish flower-bracts, like separate leaves; pod seeming single-seeded. (On the basal portion of) Mount Banajao.

Phaseolus? (No. 2); leaflets trilobed; pod compressed. "At Baños," Brackenridge.

Gen. incert. (No. 1); Mucuna-like. A vine; leaflets rather narrow; calyx nearly entire; racemes "five feet long, crowded with sky-blue flowers. On the mountains near Baños, at the elevation of 1500 feet," Brackenridge.

Guilandina bonduc? (bis No. 1 Samoan to the Hawaiian and Feejee Islands); "poisonous injections." No specimens.

——— nov. sp., (No. 4); apparently distinct; small leaflets. No specimens.

Cassia "alata," (No. 4). A fine showy shrub; pod having a carina or wing along each side. Frequent on the road to Mayjayjay; also at Baños.

Bauhinia (No. 1). "A stout tree, forty feet high;" leaves but slightly notched; pod nine inches long, close pubesc. "On the mountains near Baños," Brackenridge.

Mimosa (No. 1). A tree; leaves dichot. unijugis. Frequent at Baños, C. P.

——— (No. 2). A shrub; leaves bipinnate, the leaflets numerous. At Baños, C. P.

Inga? (No. 1); leaves paripinnate, bijugis. In the environs of Manila.

Rubus (No. 4); pinnate leaves; acid red fruit. "On the mountains near Baños," Brackenridge; and frequent along the road to Mayjayjay.

——— decumana, (No. 2, bis Tongatabu to the Feejee Islands); the shaddock. The fruit seen in the market.

——— Sinensis, (No. 3); the mandarin orange. The fruit seen in the market.

——— aurantium, (No. 4, bis Taheiti to the Hawaiian and Feejee Islands); the orange. The fruit seen in the market; but of inferior quality.

Triphasia trifoliata, (No. 1). In gardens around Manila.

Mangifera Indica, (No. 1); the mango. Cultivated.

Crotalaria (No. 1); bis Feejee Islands. Along the road-side, near Mayjayjay.

——— (verrucosa?, No. 2; compare Taheiti); leaves pubescent, simple; flowers blue. "On the mountains near Baños," Brackenridge.

Rhizophora (compare No. 1 Samoan to the Feejee Islands); the leaves large, and mucronate or tailed, as at Tongatabu, but the flowers seeming more umb. In the environs of Manila; maritime.

(Gen. Terminalioid?, No. 1). Elatostema-like; six feet high; leaves eighteen inches long, obovate, rounded and obtuse at the apex, serrate, the midrib winged. On Mount Banajao, at the elevation of 3000 feet.

(Anacharis No. 1); compare N. American Elodea; flowers pedicelled. "At Baños, growing in the Lake," Brackenridge.

Melastoma Malabathricum? (No. 2; compare No. 1 Taheiti to the Feejee Islands), but the flowers seeming finer. On Mount Banajao, from the elevation of 1000 to 3000 feet.

———? (No. 3); white close tomentum on the under surface of the leaves. "On the mountains near Banos," Brackenridge.

———? (No. 4). "A lax-growing shrub, ten feet high;" nervures arising halfway towards the apex of the leaf; panicles of smooth purple berries. "On the mountains near Baños," Brackenridge.

———? (No. 5); red bracts. On Mount Banajao.

———? (No. 6). Six feet high; leaves sessile, broad, smooth, green on both sides; flowers not seen. Mayjayjay.

———? (No. 7). A "shrub;" large green leaves; scabrellous trigonal petioles. "At Banos," Brackenridge.

Sonneratia acida, (No. 1). A small tree, fifteen to twenty-five feet high, mangrove-like. Very frequent in the environs of Manila; sub-maritime.

Myrtus (No. 5); near Feejeean sp., and like common sp.; no flowers. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

(Luffa?, No. 2); gen. Cucurb. Clustered small yellow flowers; slender; leaves angular, cordate. "At Banos," Brackenridge.

(Momordica?, No. 1); leaves deeply 5-lobed, dentate. "At Baños," Brackenridge.

Passiflora (No. 2); leaves with three deep lobes; no flowers. "On the mountains near Banos," Brackenridge.

Indigofera (compare Taheiti to the Hawaiian and Samoan Islands, and No. 25 Peru). Shrubby. Perhaps introduced.

Agati grandiflora, (No. 2, bis Hawaiian Islands). Frequent in gardens.

Cajanus Indicus, (No. 1, bis Hawaiian Islands). At Banos, and elsewhere; cultivated.

Phaseolus amœnus, (compare No. 1 Taheiti to the Hawaiian and Feejee Islands, and No. 11 Peru), but the flowers seeming larger. Growing along the road-side.

Erythrina (No. 4). A tree, "eighty feet high;" the under surface of the leaves white; the flowers scarlet. "At Banos," Brackenridge. And apparently the same species, sixty feet high with the trunk two and a half feet in diameter, on the road to Mayjayjay.

(Pongamia?, No. 2); Amerimnoid, and Robinia-like. "A tree, twenty feet high;" leaves pinnate, the leaflets acute; calyx-teeth nearly obsolete; flowers "rose-colored, appeared dif. from leaves. Planted, rather frequently, around Baños," Brackenridge.

(Cæsalpinia sappan?, No. 1; recorded as) Poinciana?. Twelve to fifteen feet high; stem prickly, pod much compressed, leaf-like. Frequent in the environs of Manila.

Mimosa pudica, (bis Taheiti to Tongatabu). Naturalized; having been introduced by colonial Whites. No specimens.

Portulaca? (No. 7). Slender; the flowers yellow. "Growing around the hot-spring at Baños," Brackenridge.

(Weinmannia?, No. 7); gen. Cunoniac. The fallen fruit found by Mr. Brackenridge "on the mountains near Baños."

Hydrocotyle (No. 2); not before met with. The carpels few and large. At Banos, C. P.

(Gen. near Aralia?, No. 1; or compare) gen. Meliac.? "A tree, thirty feet high;" leaves pinnate, the leaflets dentate; berry containing two or more seeds. "On the mountains near Baños, at the elevation of 1000 feet," Brackenridge.

Gen. Araliac., (No. 1). Leaves 9-nate, entire, acuminate. On Mount Banajao.

———, (No. 2). Twenty feet high; leaves quinate, entire. On Mount Banajao.

Gen. incert., (No. 1). Arborescent, "twenty-five feet high; the stem simple, terminating in a bunch of leaves almost like a ball; the leaves four feet long," penninerved, and sinuately dentate; flowers "not seen," probably in the axils. "On the mountains near Baños," Brackenridge.

Loranthus (No. 5); not before met with. Close pubescence on the leaves, flowers, and fruit; corolla "pale yellow. On the mountains near Banos," Brackenridge.

——— (No. 6); a second species. Agreeing with the last in habit, but smoother leaves, and the flowers more slender. "On the mountains near Banos," Brackenridge.

Rubia (No. 1); Galium-like, and very small. "Around the hot-spring at Banos," Brackenridge.

Morinda (No. 7); not before met with. "A shrub;" capit. in terminal panicles. "On the mountains near Banos, at the elevation of 1200 feet," Brackenridge.

Psychotria? (No. 6); leaves smooth, attenuate, short-petioled; terminal cymes. "On the mountains near Banos," Brackenridge.

Gen. Coffeac. with sessile blue berries, (No. 1). A shrub. On Mount Banajao, from the elevation of 4000 to 5000 feet.

Gen. Coffeac.? herbaceous, (No. 1). Climbing, rooting; the leaves verticillate. "On the mountains near Banos," Brackenridge.

Ophiorhiza (No. 4). "On the mountains near Banos, at the elevation of 1200 feet," Brackenridge.

(Hedyotis, No. 4); Oldenlandia; habit of Stellaria media. At Banos, C. P.

(———, No. 5); Oldenlandioid; suffruticose; cymes long-peduncled. On Mount Banajao, from the elevation of 3000 to 4000 feet.

(Inga dulcis?, No. 2). Arborescent, twenty feet high; leaves pinnate, Fraxinus-like; pods many-jointed, (very long, and curling). Growing along the road to Mount Banajao. No specimens.

Terminalia (catappa, No. 4), bis Tongatabu to the Feejee Islands. Planted around houses within the limits of the city; the branches given off at regular intervals, and extending horizontally, the uppermost imparting to the apex of the tree the form of the crucifix.

Jambosa (Malaccensis, No. 1, bis Taheiti to the Hawaiian and Feejee Islands). The fruit brought to market; red, but seeming smaller than the Polynesian.

Cucurbita (melopepo?; compare No. 3 North America, and C. ovifera); fruit small, in size and shape not unlike that of Carica. "Vegetable-marrow" known in the market.

Carica papaya, (bis Metia to the Hawaiian and Feejee Islands, and No. 1 Tropical America). Abundantly cultivated.

Gen. Coffeac.? with spathulate bracts, (No. 1). Large spathulate bracts; only at term.; large long leaves; no flowers. "On the mountains near Banos," Brackenridge.

(Bigelowia ?, No. 1); not before met with. Diodia-like, and almost the habit of Lycopus. "At Banos," Brackenridge.

(———?, No. 2). Diodia-like; flowers crowded in the axils. "On the mountains near Banos," Brackenridge.

Ixora coccinea? (No. 1). In the environs of Manila.

———? (No. 2); stipule becoming coriaceous; slender rose-colored flowers on long common peduncle, terminal. "On the mountains near Banos," Brackenridge.

———? (No. 3); leaves penninerved; short tubular white flowers; 4-fid. "At Banos," Brackenridge.

Gen. Coffeac.? with Dillenia-like leaves, (No. 1). Stem simple; leaves two feet long; "flowers crowded in the axils of the leaves. On the mountains near Banos, at the elevation of 1200 feet," Brackenridge.

(Gen. Siphonanthoid, No. 1). A shrub, with long tubular Ovieda-like flowers. On the basal portion of Mount Banajao.

Blumea? (No. 1); Verbascum-leaved, large. Frequent in the environs of Manila; and also at Banos.

———? (No. 2); leaves lanceolate. "On the mountains near Banos," Brackenridge.

——— (No. 3); smaller, and more slender. At Banos, C. P.

Mikania (No. 2). Climbing; leaves hastate, the margin undulated. "On the mountains near Banos," Brackenridge.

(Emilia) coccinea? (No. 1; Cacalia of Curtis). Frequent in mountain-woods; "near Banos," Brackenridge; and around Mount Banajao.

(Gynura sarmentosa?, No. 1); Cacalia-like. Climbing; leaves broad, succulent, dentate; flowers yellow. "On the mountains near Banos, at the elevation of 2000 feet," Brackenridge; also at Mayjayjay.

(Wollastonia, No. 2; compare No. 1 Samoan to the Feejee Islands), but rambling, almost a vine, and the flowers seeming smaller. In the environs of Manila; sub-maritime.

Aegiceras? (No. 1); a congener of Australian sp.? "A large tree. On the mountains near Banos, at the elevation of 2000 feet," Brackenridge.

Bryophyllum calycinum, (No. 1). At Banos, along road-sides, and elsewhere; abundantly naturalized.

Mussænda frondosa, (bis No. 1 Samoan to the Feejee Islands). Growing along the road-side. No specimens.

Geophila reniformis? (No. 1), compare Taheiti to the Feejee Islands. In the mountain-forest, "near Banos," Brackenridge; and on Mount Banajao.

Coffea Arabica, (bis Brazil, Taheiti, Hawaiian Islands, and No. 1 Equatorial Africa). Now abundantly cultivated.

Sphæranthus Indicus, (No. 1). In the environs at Manila, and at Banos; probably introduced.

(Cæsulia axillaris?, No. 1); flowers purple. Frequent in cultivated, and in open ground generally.

Elephantopus scaber? (compare No. 1 Brazil). Frequent along road-sides, and in open ground; probably introduced by colonial Whites.

Gen. Ardisiac. (No. 1). "Twelve feet high," ornamental; leaves Andromeda-like; a panicle. "On the mountains near Banos, at the elevation of 1800 feet," Brackenridge.

(———?, No. 2). A shrub; leaves alternate, serrate; cymes covered with imbricated bracts, like young branches of Juniperus. On Mount Banajao.

Tabernæmontana (compare No. 1 Tongatabu to the Feejee Islands); penninerved leaves; fleshy red geminate fruit. In the environs of Manila.

Hoya (No. 5). At Mayjayjay. No specimens.

———; the leaves seeming smaller and thicker than in Mayjayjay sp. "At Banos," Brackenridge.

(Secamone?, No. 1); Cynanchoid. A herbaceous vine; leaves ovate, smooth, subcordate at base; flowers minute, clustered in interrupted racemes. "At Banos," Brakenridge.

Labordia? (No. 7). "Twenty feet high;" leaves opposite, cushioned at base, no flowers. "On the mountains near Banos," Brackenridge.

Gen. Gentianac.? (No. 1). Habit of Vahlia Oldenland., but apparently monopetalous; a single radical whorl of four leaves, which are entire, acute at each end, puberulous; calyx 4-fid; capsule superior, dehiscent above, as though bifenestrate, the two apices uniting in a common style. "On the mountains near Banos," Brackenridge.

Gen. incert. (No. 1); Gentianoid. A vine, creeping; leaves Viola-like, but two opposite; calyx with five long teeth; berry? containing several seeds, and crowned with a bifid style. On Mount Banajao, at the elevation of 4000 feet.

Cyrtandra (No. 20); not before met with. "Six to twelve inches high;" leaves spatulate, obtuse, denticulate. "On the mountains near Banos, growing on stones in moist shady places," Brackenridge.

——— (No. 21); not before met with. Attenuate, and pointed leaves; flowers numerous. "On the mountains near Banos," Brackenridge.

———? (No. 22). Herbaceous, and only one to two inches high. Frequent in the forest; "on the mountains near Banos," Brackenridge.

(Aeschynanthus?, No. 1); gen. Cyrtandroid. Epidendric on trunks of trees, like a Loranthus; leaves opposite, Hoya-like; terminal scarlet tubular flowers, somewhat inequal. On Mount Banajao.

(Ipomœa, No. 8); large cordate leaves; fleshy calyx; white flowers. At Banos, C. P.

(———?, No. 9). Yellow-flowered, small. At Banos, and elsewhere.

(——— reniformis?, No. 10). One of the yellow-flowered species sub-aquatic.

(———?, No. 11); not before met with. Hairy; leaves deeply divided into about five lobes. "On the mountains near Banos," Brackenridge.

(Argyreia?, No. 1); Convolvul.; not before met with. Leaves puberulous; flowers almost glomerate, in glob. heads. "On the mountains near Banos," Brackenridge.

Elephantosis? (compare No. 1 Brazil). Frequent in open ground, at Banos and elsewhere; probably introduced by colonial Whites.

Spilanthus. Two feet high. "At Banos," Brackenridge.

Eclipta (bis Feejee Islands, and compare Brazil and Peru); small. Frequent around Banos, and elsewhere.

Achras mammosa. The fruit met with; which is mammosum, rough externally, and in taste somewhat resembling the lucuma of Peru.

Tournefortia (No. 2). A vine; large ovate leaves; inflorescence terminal. "At Banos," Brackenridge.

Heliotropium (No. 2); not before met with. Hairy; leaves linear. "At Banos, on the beach bordering the Lake," Brackenridge.

Cordia? (No. 2). Leaves somewhat Cratægus-like; flowers inconspicuous. "At Banos," Brackenridge.

Ehretia? (No. 1); leaves argutely serrate; compound racemes of small white flowers. Frequent around the base of mountains; "near Banos," Brackenridge, and also at Mayjayjay.

Physalis? (No. 1; compare Capsicum); not before met with. Lanceolate leaves, very small flowers. "At Banos," Brackenridge.

Solanum (No. 13). Habit of S. melongena; somewhat prickly; close toment. On Mount Banajao, probably the basal portion.

Gen. Rhinanthoid, (No. 1); showy orange-colored flowers. "At Banos, along the margin of the Lake," Brackenridge.

Gen. Lindernioid, (No. 1); the genus with elongate capsule. In the environs of Manila.

Herpestis Monnieria, (bis Brazil, Peru, and No. 1 Hawaiian Islands), but the flowers seeming larger (than in the last-named locality). In the environs of Manila; sub-maritime.

Ocymum? (No. 4); not before met with. Herbaceous, three to four feet high; leaves ovate, crenate. On Mount Banajao.

——— (No. 5); not before met with. Large purple leaves, elegantly veined; very small flowers. "At Banos," Brackenridge.

(Anisomeles?, No. 1); Phlomis-like. A shrub, eight feet high, habit of Cyrtandra; under surface of the leaves woolly; calyx nerved, sharp-toothed. In the forest on Mount Banajao, at the elevation of 3000 feet.

(Leucas linifolia?, No. 2), compare specimens formerly seen from Hindostan. Phlomis-like; smooth; leaves lanceolate; flowers white. Frequent in open ground, at Banos and elsewhere.

Gen. Leucas-like, (No. 1); but the flowers purple; calyx-teeth equal. Frequent at Banos and elsewhere.

(Premna No. 2); a congener of Polynesian sp.. A spreading tree, twenty feet high; the under surface of the leaves pubescent. In the environs of Manila; sub-maritime.

Clerodendrum "speciosum," (No. 2). Herbaceous, six feet high; red showy flowers. Frequent along road-sides; "on the mountains near Banos," Brackenridge, and on the route to Mayjayjay.

Vitex; compare Polynesian sp. (No. 1 Samoan to the Feejee Islands). "At Banos," Brackenridge.

———? (sapota). Fruit as large as a horse-chestnut, rough externally, containing about five seeds. Abundant in the market.

Mogorium sambac, (No. 1); corolla 6-cleft. Growing along road-sides. No specimens.

Tabernæmontana? (No. 3); ornamental. Planted around houses, at Banos and elsewhere.

(Batatas edulis; bis No. 1 Metia to the Hawaiian and Feejee Islands); a different variety from those seen in Polynesia, the root small: Abundantly cultivated.

Tiaridium (No. 1). Growing in the outskirts of the city; probably introduced.

Callicarpa (No. 1). "At Banos," Brackenridge.—One or more species of Callicarpa observed to be frequent in other localities.

Justicia? (No. 3). Herbaceous, eight inches high; leaves white-nerved; terminal racemes. "On the mountains near Banos," Brackenridge.

——— (No. 4); apparently a second species with variegated leaves. Decumbent; the racemes closer. "On the mountains near Banos," Brackenridge.

———? (No. 5). Woody; leaves lanceolate; red veins; terminal few-branched panicle. "On the mountains near Banos," Brackenridge.

——— (No. 6); not before met with. Small; leaves mostly rounded, but some lanceolate. "On the mountains near Banos," Brackenridge.

——— (No. 7). Three to four feet high; showy purple flowers. In the forest covering Mount Banajao, at the elevation of 2500 feet.

——— (No. 8). Having somewhat of the habit of Mentha; long bristled bracts; small slender purple flowers. "At Banos," Brackenridge.

——— (No. 9). A shrub, ten feet high; large leaves; large purple flowers. "At Banos," Brackenridge.

——— (No. 10). Two feet high; white Lobelioid flowers, with a dark spot on lip. Frequent along road-sides, at Banos and elsewhere.

——— (No. 11). Upright, three feet high; flowers in crowded whorls. "At Banos," Brackenridge.

——— (No. 12). Herbaceous, three feet high; habit of Scrophulariaceæ. In marshes near Manila.

———? (No. 13); or compare Scrophular.; habit of Lindernia; upright. In the environs of Manila, growing on rocks in the open ground.

Dicliptera? (No. 2); not before met with. Leaves broad-ovate; and leafy bracts, in long spike. "At Banos," Brackenridge.

Barleria? (No. 1). A shrub, three feet high; trifid spines below the clustered large yellow flowers. "Near the hot-spring at Banos," Brackenridge.

(Dilivaria ilicifolia, No. 1); gen. Justic. A shrub, six feet high; rigid, spinoso-dentate leaves; oval fleshy fruit. In great profusion in the environs of Manila; sub-maritime.

Plumbago (No. 4); flowers scarlet. At Banos; and along the road to Mayjayjay.

Begonia (No. 1); not before met with. Leaves inequal, cuneate at base, dentate; fruit small. On "trunks of trees, on the mountains near Banos, at the elevation of 2000 feet," Brackenridge.

Nicotiana tabacum, (bis Metia to the Hawaiian and Feejee Islands, and No. 6 North America). Abundantly cultivated; having been introduced by colonial Whites.

Solanum (No. 14; compare S. xanthocarpum). Flowers blue; fruit yellow, as large as a plum. Frequent around houses, at Banos and elsewhere.

——— melongena, (No. 15), bis United States and Peru; the egg-plant. The variety having long, finger-shaped fruit. Cultivated.

Lycopersicum esculentum, (bis United States, and No. 4 Peru); the tomato. Abundantly cultivated; having been introduced by colonial Whites.

Capsicum (frutescens; bis Taheiti to the Hawaiian and Feejee Islands, and No. 4 Peru). Six feet high; the fruit small, and numerous. Growing around houses; and also in wild situations.

——— (No. 2); not before met with. A low herb; leaves broad, the under surface pink or rose-colored. "On the mountains near Banos, growing on rocks," Brackenridge.

——— (No. 3); not before met with. Normal, resembling some Brazilian species; three to four feet high; leaves inequal, sinuately dentate, the under surface veined with red. On Mount Banajao, from the elevation of 3000 to 5000 feet.

Laurus (No. 3). "Twelve to fourteen feet high;" leaves lanceolate, glaucous beneath; buds pubescent. "On the mountains near Banos," Brackenridge.

——— (No. 4); a second species. "Eighteen to twenty feet high;" entirely smooth; no flowers. "On the mountains near Banos," Brackenridge.

Gen. near Rivina, (No. 1). Suffruticose; leaves acute at each end; flowers 5-cleft; stigmas three; berries white. "On the mountains near Banos," Brackenridge.

Chloranthus (No. 2). Herbaceous, eighteen inches high. "On the mountains near Banos," Brackenridge.

——— (No. 3); apparently a second species; the leaves argutely serrate. On Mount Banajao.

(Elæagnus, No. 1; recorded as) Hippophae; ornamental; twenty feet high. Frequent along road-sides at Mayjayjay, from the elevation of 500 to 1500 feet.

Aristolochia (No. 2); a vine. Growing at Mayjayjay. No specimens.

Phyllanthus (No. 6). A shrub, six feet high; leaves opposite. On Mount Banajao.

——— (No. 7). A shrub; leaves smooth, ovate. At Banos, C. P.

——— (No. 8); leaves oblong, hairy. "At Banos," Brackenridge.

Nov. gen. Tanarius, (bis No. 1 Taheiti to the Feejee Islands). Growing along the river-bank near Manila. No specimens.

(Omalanthus?); compare (No. 2) Samoa, but the fruit not seen. Growing along the river-bank near Manila. No specimens.

——— (No. 5). Fifteen feet high; leaves peltate, the under surface glaucous. On the summit of Mount Banajao.

——— (No. 6); seeming distinct from the last; very large peltate leaves. On Mount Banajao.

Croton (No. 3); not before met with; close pubescence; leaves broad-ovate, slightly peltate. "On the mountains near Banos, at the elevation of 1000 feet," Brackenridge.

Tragia? (No. 1). Herbaceous; leaves cordate. "At Banos," Brackenridge.

Gen. Tragia-like (No. 1). "A tree twenty feet high;" leaves Urtica-like, alternate. "At Banos," Brackenridge.

Elatostema (No. 11); narrow, long-pointed leaves. "On the mountains near Banos," Brackenridge.

Datura (fastuosa?, No. 2). Long white odorous flowers; fruit roundish, with short prickles, a large remnant of the calyx at base. Naturalized around Banos, C. P.

Lindernia (No. 1), bis Taheiti to the Feejee Islands. At Banos, C. P.

Scoparia dulcis, (bis No. 1 Brazil and Peru). Frequent in the open ground, at Banos and elsewhere; probably introduced.

Leucas (10-dentatus, No. 1, bis Metia to the Feejee Islands), but seeming more tomentose. At Banos, and elsewhere, C. P.

Hyptis capitata, (bis No. 1 Brazil). At Banos, abundantly naturalized, C. P.

Leonurus Tataricus, (bis Rio Janeiro). Along road-sides; naturalized.

——— (No 12); not before met with; leaves broad, inequal at base, serrate. On Mount Banajao.

——— (No. 13). Smaller, pubescent, the leaves narrower. On Mount Banajao.

——— (No. 14); not before met with. Climbing about trunks of trees; leaves small, obtuse, crenate. On Mount Banajao.

(Epicarpurus?, No. 6); gen. Elatostemoid; a congener of Feejeean sp. A tree, thirty feet high; leaves penninerved, caudate; fruit solitary. At the elevation of 3000 feet on Mount Banajao.

Ficus (No. 14); not before met with. Leaves reticulate, inequal. "In woods on the mountains near Banos, at the elevation of 1400 feet," Brackenridge.

——— (No. 15). Habit of Celtis; leaves caudate, the acumination very long. On Mount Banajao.

———? (No. 16); leaves penninerved, expanded at the apex. On Mount Banajao.

——— (No. 17); scabrous; leaves seven inches, denticulate, ovate, caudate; sessile pisiform fruit. "At Banos," Brackenridge.

——— (No. 18); leaves smooth, caudate, the nervures very prominent beneath; fruit peduncled, red, as large as a cherry. "At Banos," Brackenridge.

——— (No. 19); not before met with; oak-leaved. "At Banos," Brackenridge.

——— repens? (No. 20). "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge. Growing also at Mayjayjay.

——— (No. 21); seeming distinct from F. repens, the leaves larger, cordate. "On the mountains near Banos," Brackenridge.

———?; larger leaved than the other creeping sp. "On the mountains near Banos," Brackenridge.

Nov. gen. near Ficus, (No. 3); the fruit plicate or ribbed, as in Feejeean sp.; leaves inequal at base, smooth. "At the base of the mountains near Banos," Brackenridge.

Procris? (No. 6); under surface of the leaves very softly pubescent. "At Banos," Brackenridge.

Piper (No. 8); leaves somewhat Melastoma-like, the under surface glaucous. On Mount Banajao.

———? (No. 9); leaves clasping, inequal at base. On Mount Banajao.

——— (No. 10); not before met with. Six feet high; leaves ovate; fruit red. On Mount Banajao.

——— (No. 11). Climbing, smooth; leaves 5-ribbed; fruit red, size of shot. In the environs of Manila.

——— (No. 12); not before met with. A vine; leaves ovate. "At Banos," Brackenridge.

Zapania (compare No. 1 California, our Atlantic States, Patagonia, and Chili). At Banos, (naturalized), C. P.

Achyranthes (compare No. 2 Metia to the Feejee Islands). In cultivated ground, at Banos and elsewhere.

Celosia (No. 1). In cultivated ground, at Banos and elsewhere.

Aerua (No. 1; compare Rio Janeiro). Growing around Banos, C. P.

Desmochæta (compare No. 1 Taheiti to the Feejee Islands). Frequent around houses, at Banos and elsewhere.

Peperomia (No. 17); leaves simple, subrotund. On "trunks of trees on the mountains near Banos," Brackenridge. The only species met with.

(Vallisneria?, No. 1). Grass-like leaves, resembling those of Sparganium natans. "At Banos, growing in the Lake," Brackenridge.

Pistia stratiotes, (No. 1, bis Peru). Floating down the river in immense quantities, from the Lake.

Potamogeton (No. 3). "At Banos, growing in the Lake," Brackenridge.

Najas (No. 1); prickly, the leaves almost filiform. "At Banos," Brackenridge.

Gen. Neottioid, (No. 8). Growing on the ground; a foot high; leaves broad-ovate, or cordate; a few large capsules. On Mount Banajao.

Gen. Habenaria-like, (No. 1). Two feet high; the petals seem to be all thread-like. "On the mountains near Banos, at the elevation of 1200 feet," Brackenridge.

Gen. Calanthoid, (No. 1); flower-stem devoid of leaves; the leaves separate, two feet long. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

———, (No. 2); Mr. Brackenridge thinks this distinct from the last. Leaf two feet long; flower-stem separate. On Mount Banajao.

Gen. Orchidac.? (No. 1). Creeping, "attached to trunks, twelve feet;" leaves cordate, sessile, closely covering the stem; no flowers. "On the mountains near Banos," Brackenridge.

Oberonia? (No. 8). Epidendric; equitant compressed leaves, an inch in length. "At Banos," Brackenridge.

"Epidendrum" (No. 4); a congener? of compressed Feejeean species. Epidendric; large, coarse; compressed bulb at base of leaves. "At Banos," Brackenridge.

(———?, No. 5). Epidendric; woody stems, a foot in height; slender axillary racemes. "At Banos," Brackenridge.

(———?, No. 6). Epidendric; an upright stem, a foot in height; several terminal long filiform racemes. On Mount Banajao.

(———?, No. 7). Epidendric; leafy stems; leaves an inch long, crowded. "At Banos," Brackenridge.

Gen. Dendrobioid with cylindrical leaves, (No. 3); near Taheitian sp. Leaves awl-shaped; but pectinate; bulbs at base of stem, one above the other; terminal raceme of flowers. "At Banos," Brackenridge.

"Broughtonia?" (No. 1). Epidendric; stem a foot in height, and leafy after the manner of Freycinetia; the leaves large, lanceolate, pointed; no flowers. "At Banos," Brackenridge.

Gen. Stelis-like, (No. 1). Bulb at base of single leaf; the flower-stem separate; capsule rounded, smaller than a pea, smooth. On Mount Banajao.

Phyllanthus (niruri?, No. 9; compare Taheiti). A foot high; numerous small leaves. "At Banos," Brackenridge.

Euphorbia (tirucalli, No. 9). Ten feet high; thick fleshy branchlets; no flowers. In the garden of a native, on the route to Mayjayjay.

Codiæum variegatum, (No. 1, bis Samoan to the Feejee Islands). Planted by the natives, and rather frequently.

Acalypha Caroliniana? (compare No. 1 Samoa to Tongatabu). "At Banos," Brackenridge.

(——— ?, No. 2); habit of the first, but larger, and no bulb at base of leaf. On Mount Banajao.

——— (No. 3); a congener of the first, but leaves a foot in length, long-petioled. "At Banos," Brackenridge.

"Cymbidium" of some writers, (No. 1). Epidendric; leaves hard, rigid, coriaceous, ensiform, inequal, the apex rounded. "On the mountains near Banos," Brackenridge.

(Gen. Maxillarioid, No. 8). Epidendric; two elliptical leaves; the flower-stem separate; flowers few, two inches in diameter, pale pink or rose-colored. "On the mountains near Banos," Brackenridge.

(——— No. 9). Epidendric; two to three inches; flower-stem separate, the flowers very small. "On the mountains near Banos," Brackenridge.

(Aerides ?, No. 1). Epidendric; long pine-like leaves; a lateral raceme of very small flowers. "On the mountains near Banos," Brackenridge.

(——— ?, No. 2). Epidendric; rigid, somewhat involute leaves; inflorescence radical. "On the mountains near Banos," Brackenridge.

Gen. Dendrob. with sessile flowers, (No. 1). Epidendric; three to four inches; leaves equitant, and having a scarious margin; flowers solitary, sessile. "On the mountains near Banos," Brackenridge.

Gen. Epidendr., (No. 1). Epidendric, climbing and branching; the flower-stems separate. On Mount Banajao.

——— ? (No. 2). Epidendric; dichotomous tortuous stems, straggling, with few leaves. "At Banos," Brackenridge.

Zingiber (compare No. 1 Hawaiian and Samoan to the Feejee Islands). Seeming distinct from Polynesian sp.; two and a half feet high. "On the mountains near Banos," Brackenridge.

Globba nutans ? (No. 1). Branching; glob. white berries; no flowers. "On the mountains near Banos, at the elevation of 2000 feet," Brackenridge.

(Gen. Alpinioid, No. 1); gen. Scitamin. Leaves Zingiber-like, but narrower and caudate; terminal raceme of red berries. On Mount Banajao.

Gen. near Dioscorea, (No. 1); but the fruit five inches long, and stipitate for an additional inch. "On the mountains near Banos," Brackenridge.

Dioscorea (No. 8). Growing along the road to Mayjayjay.

Gen. Smilax-like, (No. 1); compare Dioscoreac., as the leaves are membranous. Stem with slight prickles; leaves narrow auric. at base. "On the mountains near Banos," Brackenridge.

Smilax (No. 5). Normal; leaves large, ovate, the under surface white. "On the mountains near Banos," Brackenridge.

(Curcas purgans, No. 2, bis Brazil); Jatropha of Linn. Abundantly planted, along roadsides and elsewhere.

Artocarpus incisa? (No. 1, compare Metia to the Hawaiian and Feejee Islands), but having a different aspect, the leaves more puberulous, and the petioles seeming longer; the fruit not seen. No specimens.

——— ? integrifolia, (No. 2). Planted; and observed bearing fruit.

Ficus (compare No. 8 Samoan to the Feejee Islands); leaves very smooth, entire, and coriaceous; pea-like fruit. "At Banos," Brackenridge.

Dichorisandra? (No. 1). Two feet high; a terminal panicle of showy blue flowers. "On the mountains near Banos, at the elevation of 1400 feet," Brackenridge.

Gen. Tradescantioid, (No. 1). Prostrate; leaves purple; long hairs; no flowers. "At Banos," Brackenridge.

(Chamærops?, No. 1). A dwarf palm; almost stemless; frond flabellate. In marshy ground. No specimens.

Nipa? (No. 1). The trunk hardly projecting above the ground; frond pinnate, twice as long as those of the cocoa-palm. Frequent in the environs of Manila. No specimens.

Calamus? (No. 1). Stem "four feet high, upright;" fronds pinnate, the under surface white; mid-rib spiny, and pubescent. "At Banos," Brackenridge.

(——— ?, No. 2). "Twenty feet high, upright, habit of Areca;" the segments of the frond almost in pairs, alternate, one above the other; spines on midrib. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

——— (No. 3); a normal ratan. A climbing palm, but the stem invested with a sort of prickly bark; short bristles on frond. Frequent in the forest; on Mount Banajao, and elsewhere.

Gen. Palmac. (No. 1). Stemless; entirely smooth; the young fronds undivided, with the margin dentate. At the elevation of 3000 feet on Mount Banajao.

Pandanus (No. 3); leaves narrower and longer than in Polynesian sp., with longer prickles. Frequent near the Bay-shore; and "trees twenty feet high" seen by Mr. Brackenridge "in the forest, as far as the elevation of 1500 feet on the mountains near Banos."

Freycinetia (No. 10). Much branched; and producing numerous linear-lanceolate leaves, at first mistaken for those of a willow. On Mount Banajao.

——— (No. 11); not before met with. Leaves with hooked prickles at base, and beyond these entire; floral bracts "red, with pale orange tint, fruit yellow. At Banos," Brackenridge.

——— (No. 12); not before met with. Leaves medium, the margin nearly smooth; fruit glob., Sparganium-like. "On the mountains near Banos," Brackenridge.

——— ? (No. 13); "Eighteen inches high, and not climbing;" leaves Bromelia-like, narrow, and very prickly. "On the mountains near Banos," Brackenridge. The same species, six feet long, at the elevation of 3000 feet on Mount Banajao.

(Colocasia, No. 1); compare C. macrorhiza of Polynesia, (Metia to the Hawaiian and Feejee Islands). Growing in the forest. No specimens.

Pothos (No. 3); not before met with. Leaves narrow-ovate, entire, the petioles broadly alate. "On the mountains near Banos," Brackenridge.

——— (No. 4); large pectinate leaves. In the environs of Manila.

——— (No. 5); a second pinnatisect species, but larger lobes. "At Banos," Brackenridge.

Piper betel, (No. 13). A vine. Extensively cultivated by the natives.

Canna Indica, (bis Taheiti to the Hawaiian and Feejee Islands, and No. 1 Brazil and Peru); scarlet-flowered. Abundantly planted for ornament by the natives.

Musa paradisica, (bis Metia, and No. 1 Samoan to the Hawaiian and Feejee Islands). Abundantly cultivated, and some of the varieties producing fruit of very superior quality; one, which was not met with, yielding the textile fibre called "Manila hemp." (The varieties of the banana were more numerous at Manila than in any other part of the Globe I have visited.)

———? (No. 6). "Upright, a foot high;" leaves ovate, acuminate. "At Banos, growing on banks," Brackenridge.

Flagellaria (bis No. 1 Samoan to the Feejee Islands). On the basal portion of Mount Banajao; once only met with. No specimens.

Scleria (No. 11); not before met with. Abounding on Mount Banajao, from the elevation of 2000 to 4000 feet.

Fimbristylis? (No. 9); small spikelets. At Banos, C. P.

——— (No. 10); a second species; the spikelets smaller. In the environs of Manila.

Cyperus (No. 9). Small, six inches high. At Banos, C. P.

——— (No. 10); the inflorescence lateral; with a single bract. In the environs of Manila.

Panicum (No. 10). Normal; the florets very small. On Mount Banajao.

Orthopogon; compare Polynesian sp., (No. 1 Taheiti to the Hawaiian and Feejee Islands). "On the mountains near Banos," Brackenridge.

Rhapis (acicularis, No. 1, compare Taheiti to the Hawaiian and Feejee Islands), but seeming taller. In the open ground, around Mount Banajao and elsewhere; possibly indigenous.

Sorghum (Halepense, No. 1, bis Peru). "Wild on the mountains near Banos," Brackenridge. (Perhaps only naturalized?).

Gen. Poac.; compare (No. 1 Taheiti to the Feejee Islands); the woodland species, having the florets acute. On Mount Banajao.

Eragrostis (No. 4). Small; six inches, decumbent. In the environs of Manila.

——— (No. 5); very minute spikelets. At Banos, C. P.

Apluda? (No. 1). Straggling; "four feet high," and branching; no awns. "On the mountains near Banos," Brackenridge.

Chloris (No. 1). Small. Frequent in open places, in the environs of Manila.

(Gen. near Chloris, No. 1; recorded as) Chloris?; like diminutive Hordeum. "At Banos," Brackenridge.

Dracæna terminalis, (bis Metia to the Hawaiian Islands and No. 1 Feejee Islands). The variety having pink and red-margined leaves, cultivated by the natives; being the only kind met with.

Ananas (bis Taheiti to the Feejee Islands, and No. 1 Tropical America); the pine-apple. Introduced by colonial Whites; the plant not seen, but cloth woven from its fibres was spoken of.

Commelina (No. 1, compare Samoan to the Hawaiian and Feejee Islands); blue-flowered. In the environs of Manila; probably introduced.

———; perhaps a second blue-flowered species.

Cocos nucifera, (bis Paumotuan coral-islands to the Hawaiian and Feejeean Group, and No. 1 Tropical America). Abundantly cultivated, for the purpose of procuring "toddy;" the plantations extending inland along the route to Mayjayjay, as far as ten miles from the shore even of the Lake.

Areca catechu, (No. 4). Having a different aspect from the Polynesian Arecas, the leaves shorter and curving downwards. Abundantly planted by the natives; having been introduced by aboriginal settlers.

Corypha umbraculifera? (No. 1). Very large; the trunk stout, six feet; petiole margined with spines. A single stock seen, planted near the dwelling of a native.

Bambos ? (No. 2) ; compare B. arundinacea. Rambling, small-leaved. In the forest on Mount Banajao, at the elevation of 3000 feet. Perhaps the same species, the fruit like a hard berry, "at Banos," Brackenridge.

Lycopodium (No. 18); habit of L. clavatum. On Mount Banajao.

——— (No. 19); not before met with. Pendulous from trunks of trees; long cylindrical spikes. On Mount Banajao.

——— (No. 20); not before met with. Pendulous from trunks of trees; crowded acicular leaves; quadrangular spikes. On Mount Banajao.

(Selaginella, No. 6); near L. hypnoides. Creeping; "three to four feet. On the mountains near Banos," Brackenridge.

(——— No. 7). Hypnoid; upright, with a creeping stem. "On the mountains near Banos," Brackenridge.

Trichomanes; compare (No. 6) Feejee Islands. Clustered, eighteen inches high; with multifid linear segments. "On the mountains near Banos," Brackenridge.

——— (No. 18); near (No. 2 Samoan and) Feejee Islands. Clustered; frond pinn., beset with filaments below. "On the mountains near Banos," Brackenridge.

——— (No. 19); not before met with; a second pinnate species. Taller and stouter than the last; fructification mostly at end of branches. "On the mountains near Banos," Brackenridge.

——— (No. 20); not before met with. Growing "on trunks of trees;" habit of Hymenophyllum; segments linear, entire. "On the mountains near Banos," Brackenridge.

——— (No. 21). Growing on the "bark of trees;" frond broad, and an inch in height. "On the mountains near Banos," Brackenridge.

Hymenophyllum (No. 12); segments entire, obtuse. On Mount Banajao.

(Colocasia antiquorum, No. 2, bis Metia to the Hawaiian and Feejee Islands). Occasionally planted along the muddy river-bank; but the cultivation seemed quite limited, and unimportant.

Eleocharis capitata ? (compare Feejee Islands and No. 17 Peru). Abounding in marshes in the environs of Manila..

Kyllingia (monocephala, No. 1; compare Brazil, Peru, and Taheiti to the Hawaiian and Feejee Islands); white-headed. Growing in marshy ground in the environs of Manila.

Digitaria, (compare Polynesian sp.). At Banos, C. P.

Oryza sativa, (No. 1); unawned. In the environs of Manila; extensively cultivated, and constituting the chief support of the natives. The genus much like Leersia.

Dactyloctenium Aegyptiacum ? (No. 1). At Banos, C. P.

Bambos arundinacea, (No. 3); in habit more feathery, and the leaves narrower than in the Polynesian sp. The clusters planted along river-banks and roadsides resemble willow trees in the distance, except in being more lofty. The plant applied to a great variety of uses by the natives.

Saccharum officinale, (bis Metia to the Hawaiian Islands and No. 1 Feejee Islands); the sugar cane. Abundantly cultivated; but not seen naturalized.

Zea mays, (bis United States, Chili, and No. 1 Peru); Indian corn. A variety or kind, presenting nothing remarkable in its aspect, often seen in market; the spikes or ears rather small and slender. Introduced by colonial Whites; but now abundantly cultivated by the natives.

——— (No. 13); not before met with. Glaucous and hairy on both sides. On Mount Banajao.

Dicksonia (No. 15); frond tripinn., spreading. On Mount Banajao.

Davallia (No. 5); sori rather small. "On the mountains near Banos," Brackenridge.

——— (No. 6); but three to four feet high, spreading; frond 4-pinnate. On Mount Banajao.

Gen. Davallioid, (No. 3); perhaps a congener of Polynesian Davallioid. Lindsæa-like; frond pinnate, incised above. On "trunks of trees on the mountains near Banos," Brackenridge.

Acrostichum aureum, (bis Brazil and No. 2 Taheiti to the Feejee Islands). In the environs of Manila; sub-maritime.

———? (No. 13). A simple lanceolate coriaceous frond; no fructification. On Mount Banajao.

———? (No. 14). Climbing rhizoma, yet rooting at point; fronds pinnate, caudate, the fertile one separate. On "trunks of trees on the mountains near Banos," Brackenridge.

Gen. (Acrostichoid, No. 1); segments broad-ovate, coriaceous, entire; probably a separate fertile frond. Growing "in bunches on trees, on the mountains near Banos at the elevation of 1800 feet," Brackenridge.

Schizæa (No. 6); not before met with. Simple, the stem bialate. "On the mountains near Banos," Brackenridge.

Adiantum? (No. 10); or perhaps Lindsæa. Frond pinnate, six inches high. On Mount Banajao.

——— (No. 11); not before met with; frond simply pinnate. "At Banos," Brackenridge.

Lindsæa (No. 8); two feet high. "On the mountains near Banos," Brackenridge.

(Angiopteris evecta?); compare (No. 1) Taheiti (to the Feejee Islands, and) Marattia?. Trunk six feet high; fronds spreading, fifteen feet in length. On Mount Banajao.

Lygodium (No. 2); finely divided segments. Frequent at Banos, and elsewhere.

——— (No. 3); not before met with. Larger and broader fronds. "On the mountains near Banos," Brackenridge.

Nov. gen. Wallichii; bis (No. 1) Feejee Islands; Polypodium of some writers. Flabellate. On Mount Banajao, at the elevation of 5000 feet.

Polypodium phymatodes; bis Polynesian sp. (No. 1 Paumotuan coral-islands to the Feejeean Group). "At Banos," Brackenridge.

———; compare the true P. phymatodes; seeming different from the Polynesian sp. "On the mountains near Banos," Brackenridge.

———? (No. 26); not before met with. "Four feet high;" frond bipinn.; fructification irregularly scattered. "On the mountains near Banos," Brackenridge.

———? (No. 27); not before met with. Frond narrow, Vittaria-like, but rooting; and sometimes pinn. at base; young fronds also pinn., &c. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

——— (No. 28); not before met with. Frond pinn., the segments narrow and few. On "wet rocks on the mountains near Banos," Brackenridge.

——— (No. 29). Four feet high; frond pinn., sinuate; sori numerous. "On the mountains near Banos," Brackenridge.

——— (No. 30); not before met with. Four feet high; frond bipinnatisect, reticulate or the nervures prominent. "On the mountains near Banos," Brackenridge.

——— (No. 31); not before met with. A rhizoma; frond tripartite. "On the mountains near Banos," Brackenridge.

——— (No. 32); not before met with. Frond reticulate, pinn., having about five large lobes. "On the mountains near Banos," Brackenridge.

——— (No. 33); not before met with. Six inches high; segments like diminutive oak-leaves. "On the mountains near Banos," Brackenridge.

——— (No. 34); not before met with. Epidendric; frond pectinate, the under surface glaucous. On trunks of trees on Mount Banajao.

———? (No. 35); not before met with; habit of Davallia. On Mount Banajao.

———? (No. 36); not before met with. Rhizoma very bristly; fronds bipinn., pubescent. "On the mountains near Banos," Brackenridge.

Gen. Polypodioid with accessory scarious fronds, (No. 2); like Feejeean sp. Fronds pinn., fertile at the apex; fructification in dots along naked midrib. "High on trees, on the mountains near Banos," Brackenridge.

Microsorus (No. 9); frond very long and narrow. "On the mountains near Banos," Brackenridge.

——— (No. 10); not before met with. Fronds six inches, lanceolate, rigid. "On the mountains near Banos," Brackenridge.

Cyathea? (No. 6); but the fructification seeming too small. "A tree-fern, twelve feet high. On the mountains near Banos," Brackenridge.

———? (No. 7); a second species. A tree-fern; under surface of the frond glaucous; no fructification. On Mount Banajao.

Vittaria (compare Polynesian sp.); true. On Mount Banajao.

——— nov. sp., (No. 3); not before met with. Fronds broad, tapering at each end "On the mountains near Banos," Brackenridge.

Pteris Chinensis?; compare (No. 8 Samoan to the Feejee Islands). "At Banos," Brackenridge.

———; compare (No. 10 Hawaiian and) Feejee Islands; frond bipinn., with lower segments appendaged. "On the mountains near Banos," Brackenridge.

——— (No. 18); frond bipinn.; the segments long, entire, at right angles. "On the mountains near Banos," Brackenridge.

——— (No. 19); about three long entire segments. "On the mountains near Banos," Brackenridge.

——— (No. 20); not before met with. Simply pinn., the segments auriculate, clasping. "At Banos," Brackenridge.

Gen. Lomarioid, (No. 3); not before met with. Ornamental; sarmentose, and rooting at apex; paleaceous; frond pinnate, crenate. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

Thelypteris (No. 12); not before met with. Stipe very pubescent. "On the mountains near Banos," Brackenridge.

——— (No. 13); a second species. In the environs of Manila.

(Nephrodium); compare Polynesian sp. Near N. exaltatum. Frequent on Mount Banajao.

Aspidium (No. 19); not before met with. Frond tripinn., dent., shining above; the segments trapezoidal. "On the mountains near Banos," Brackenridge.

——— (No. 20); not before met with. Frond tripinn., the segments trapezoidal, larger; thick paleaceous stipe. "On the mountains near Banos," Brackenridge.

Diplazia (No. 12); not before met with. On Mount Banajao.

Asplenium; compare A. nidus of the Hawaiian Islands. "On the mountains near Banos," Brackenridge.

——— (No. 37); congen. of A. nidus?, but frond pinn.; entire, caudate segments; fructification in numerous parallel lines; near Maui sp. "On the mountains near Banos," Brackenridge.

——— (No. 38). Simple lanceolate frond; sori large. "On the mountains near Banos," Brackenridge.

——— (No. 39); not before met with. Habit of Adiantum; simply pinn. "On the mountains near Banos, at the elevation of 1500 feet," Brackenridge.

——— (No. 40); segments cuneate, almost fringed. "On the mountains near Banos," Brackenridge.

——— (No. 41); segments cuneate, toothed at the apex. "On the mountains near Banos," Brackenridge.

——— (No. 42); not before met with. Habit of A. serra; more regular. On Mount Banajao.

Elebocarpus oleracea, (No. 1); Parkeria of some writers. The tufts might be mistaken for leaves of an Umbelliferous plant. Frequent in marshes, around Manila, and also at Mayjayjay.

Gen. Filic. Marchantia-like, (No. 1). Barren fronds ovate, appressed to the surface of overhanging banks; fertile ones separate, filiform. Near the mission buildings at Mayjayjay.

Musci. Mosses of various genera, abundant.

Gen. Fungus-like. "Covering stones in the hot spring at Banos, in water of the temperature of 140° to 160°," Dana.

From collections formerly seen, I could sometimes distinguish traces of the neighboring Chinese East Indian Region; which includes Formosa, and probably the Northern Extreme of Luzon. The above-enumerated plants mostly belong to the Mindanayan East Indian Region, to be mentioned presently: but being gathered not far within the boundary, I have for the sake of comparison inserted them separately.

10. The Luzono-Bornean Mountain-region, around the Sulu Sea.

The summit of Mount Banajao was ascertained by Lieutenant Eld to be a "little over 6500 feet" in elevation. We were here on a ridge, having a very steep hardly accessible declivity towards the South; the weather uncomfortably cold; and so thick and rainy, that we were unable to see far down the mountain, or obtain a view beyond in any direction.

The forest continued, and in the general vegetable growth there

was no very marked change; yet many of the plants gave indications of a separate and cooler botanical region; as will appear from those enumerated in the following List:

Rubus (No. 5); not before met with. Leaves pubescent, 5-lobed, reticulate and papillose as in some Melastomaceæ. Growing on the apex of Mount Banajao.

Sambucus (No. 1); twenty feet high. Frequent at the commencement of the forest on Mount Banajao, at the elevation of about 2000 feet.

Nertera (No. 2; compare No. 1 Hawaiian Islands). Frequent on Mount Banajao, from the elevation of 3000 to 5000 feet.

(Cirsium No. 1; recorded as) Cnicus, near C. horridulus; the flowers yellowish. Growing only on the apex of Mount Banajao.

Rhododendrum? (No. 1); or compare Java genus (Vireya). Leaves with minute black punctures, the midrib red; the fruit Rhododendrum-like. Growing only on the apex of Mount Banajao. The specimen of the fruit subsequently lost.

Gualtheria (No. 1. A clustered shrub), epidendric on trunks of trees; the berries black. Seen only on the apex of Mount Banajao.

Polygonum (No. 3). Eight inches high; leaves broad-ovate; raceme dense. Growing only on the apex of Mount Banajao.

(Omalanthus?, bis No. 5; already mentioned as properly belonging to the warm region, though) seen only on the apex of Mount Banajao.

Quercus (No. 1). "The tree not seen;" the acorns rather short and broad, and the cup very flat, close toment. Fallen acorns found by Mr. Brackenridge, at the elevation of "1500 feet on the mountains near Banos."

Gen. Abies-like, (No. 1); branchlets covered on all sides with oblique leaves. The prevailing tree on the apex of Mount Banajao, and with all other kinds growing there, reduced to the height of only twenty to thirty feet.

Taxus? (No. 1); not before met with. Leaves of the size of those of T. Canadensis. A fallen branch found in the forest, at the elevation of 5000 feet on Mount Banajao.

Gen. Podocarpoid, (No. 2); a congener? of Feejeean sp. and of P. elongatus. A shrub, six feet high. On Mount Banajao, growing at the elevation of from 4000 to 6000 feet.

Goodyera (No. 1); leaves beautifully veined with red. "On the mountains near Banos, at the elevation of 1400 feet," Brackenridge.

——— (No. 2); not before met with, a second species. Leaves small, not variegated. On Mount Banajao, at the elevation of 4000 feet.

Gahnia (No. 2); a congener of Taheitian (and New Zealand) sp. On the apex of Mount Banajao. No specimens.

Gleichenia (No. 5); not before met with. Divisions of the frond elongate, narrow, pinnatisect. Growing on the apex of Mount Banajao.

Nov. gen. Steganioid, (No. 1); a congener of New Zealand sp. (Having the same mode of growth as tree-ferns, but humble, with the central woody stem as slender as a quill); fronds runcinato-bipinn.; fructification not seen. On Mount Banajao, at the elevation of 5000 feet.

Gen. Polypodioid, (No. 1); habit of small pinnate Polypodiums; sori enclosed by folding of segment, and solitary. On Mount Banajao, at the elevation of 5500 feet.

Polypodium (No. 37); not before met with. Hairy; frond linear; two series of dots. On Mount Banajao, at the elevation of 5000 feet.

11. The Mindanayan East Indian Region.

On the morning of the 22d, the Vincennes, having passed out of Manila Bay, proceeded South among several small islands towards Mindoro: a large island in sight, commencing with Calavite Peak, a pyramidal mountain-mass "two thousand feet" in elevation. As we drew near, the dense forest covering the gradual and rather regular slopes, was observed to be interrupted in various places by extensive openings: towards evening, we reached the island, and were proceeding close along the Western shore, the summit of the Peak from this point of view, instead of angular, appearing rounded.—On the 23d, the wind was very light; the land continuing high, broken, massive, and mountainous, at some points projecting above a stratum of clouds, and the extreme elevation being "3126 feet." From the coast inland, the country seemed everywhere covered with a luxuriant and very nearly unbroken forest. As we proceeded, the Southern portion of the island, though hilly, proved somewhat less elevated.

In the West, Kalamian was much of the time in sight; looking like a succession of rocks and rocky islets, rather than continuous land.

On the 24th, we passed some rocky islets, detached from the mainland of Mindoro, and two or three hundred feet in elevation. They were covered with a continuous forest; *bamboos* being here and there distinguished in the midst; and according to Mr. Brackenridge, also *palms*, a tribe of plants seldom prominent in the forest on the Philippine Islands.—On the 25th, in passing the extreme point of Mindoro, some islets came in sight in the Southwest; the outer one, of considerable size and one or two hundred feet in elevation, being in great part unwooded; while the islets Northeast of our position were completely covered with a dense forest.—Turning in that direction, the Vincennes on the 26th passed close around a small islet, rocky and precipitous at its Eastern end; evidently not stratified, but in some places excavated, and though hardly volcanic, bearing much general resemblance to Matthews' Rock in the Pacific. The way being now clear, across the channel, the Vincennes proceeded South.

On the morning of the 27th, while yet in the channel, some large islands were in sight in the Northeast; and among the rest, "one of the highest mountains in the Philippine Islands, eighty miles distant

on the Island of SETOAL." The mountain had not the outline and regular shape of a volcano, and was somewhat obliquely truncated at the apex.

For the first twenty miles, the island of PANAY seemed lower than Mindoro, with its surface more even; but as we continued sailing along the Western shore, the land by degrees became mountainous; and in the afternoon, lofty and very much broken. A remarkable terrace here commenced, extending for miles midway along the face of the mountain slope; while lower down, some of the nearer hills were observed to be unwooded.—On the 28th, communication was held with the shore; and a quantity of fine-grained and beautiful *iron sand* was brought off "from the beach;" also rolled pebbles, one of them *jaspery*, with seams of chalcedony; but among all the specimens, there was nothing of a volcanic character.—On the morning of the 29th, the wind was light, as during most of the time that we have been under the land, all the way from the Northern Extreme of Mindoro: the line of shoals leaving a continuous deep passage close along the shore, and entirely safe for vessels, at least during this the Northeast Monsoon. From Panay, the Vincennes proceeded South, the wind increasing; and in a few hours, we entirely lost sight of land.

On the 30th, the weather was cloudy; but during the forenoon, we distinguished the outline of the Western Extreme of MINDANAO. Approaching obliquely, at 5 P.M. we were sailing close along the land; everywhere covered with an unbroken forest of large trees, far exceeding in magnificence the portion of the East Indies we had previously visited. In the absence of all signs of inhabitants, the large luxuriant forest-trees were evidently in great variety; but throughout the landscape, neither palms nor bamboos were visible. At sunset, the Vincennes rounded a point of land, and anchored close to the small Spanish fort of Caldera.

On the 31st, I landed with others on a beach composed in part of *sand*, but mainly of small pebbles: some of them *chalcedonic;* others *porphyritic;* others again of *conglomerate rock*, and entirely similar to many seen later in the day in the bed of an inland stream. For neither here, nor throughout our day's excursion, did we meet with solid rock; the soil over which we passed being chiefly clay.

Beyond the sea-beach, we followed a path through the forest directly towards the Interior; the trees exceedingly lofty, everywhere a hundred feet or more high; with the trunk singularly straight for a good part

of this height, until dividing into a spreading top, too distant for species to be distinguished. One or more kinds having board-like buttresses widely-projecting around the base of the trunk, may have belonged to the genus *Ficus;* other species of this genus being frequent. Lofty-climbing woody *vines* were also frequent; some with a stem several inches in diameter, enveloping trees in anaconda-like folds, and bearing flowers and foliage out of reach in the tree-tops: the genus *Bauhinia* was however met with. Of more humble vines, species of *Cissus* were frequent; and we met with climbing *Convolvulaceæ*, and even *Cucurbitaceæ;* the *Phaseoleæ* seeming chiefly confined to the border of the forest. Among *palms*, the terminal crown of fronds of climbing *Calami* projected here and there above the tops of the loftiest trees; but of the variety of other fine palms met with, none exceeded thirty feet in height.—As compared with Polynesia and Luzon: *Elatostemas* had become rare; and Freycinetias, tree-ferns, and Cyrtandras, were not even met with.

Beyond the above-mentioned inland stream, the forest in one instance gave place to what was at first mistaken for a tract or grove of Eucalypti: the trees in their sparse branches and foliage presenting the ghost-like Australian aspect, further heightened by smooth purplish trunks, as though devoid of bark, and by camphorated leaves; but these proved opposite, and with the diverse fruit, indicated another genus of the Myrtaceæ, apparently *Melaleuca*.

We crossed an opening, possibly natural, but which I was more inclined to regard as an ancient clearing. Like other similar openings seen in the distance in the midst of the forest, the margin was sharply marked by the ceasing of the surrounding dense growth of large trees. The open space was chiefly overgrown with coarse grasses, six feet or more high: as *Sorghum Halepense; Saccharum officinale* or sugar-cane, more slender-stemmed than even at the Feejee Islands; *Apluda?;* and *gen. Rotboellioid*, or perhaps Lepturus. *Convolvulaceæ* were intermingled with the grasses; also, some plants that were not indigenous, as a Hyptis with oval capit. of blue flowers.

The weather proved very hot and sultry; and though there was a little rain during the day, the plants outside of the commencement of the forest were observed on our return to bear marks of suffering. We met with signs of occasional heavy rains; and from the clayey character of the soil, travelling at such times must be difficult. In regard to the results of our excursion, the variety of plants was less than we

anticipated; but may probably increase in advancing inland, higher up the mountains.

On the 1st of February, the Vincennes sailed; and after gaining an offing, we looked back upon the mountainous Interior of Mindanao. The land-surface, not very much broken, everywhere rose rather evenly; and the extreme elevation, judging by the height of a ship sailing in the distance near the shore, did not seem less than three thousand feet.

The wind was light, and with a current bearing us Northward, we passed BASILAN; an island of some importance, in plain sight from Caldera. At sunset, the Vincennes anchored near an islet, having reached the outskirts of the Suluan archipelago of islets.

On the 2d, the wind was light but favorable, being from the Southward and Eastward. We continued sailing among scattered islets; some of them high; others inconsiderable, mere rocks; others again, low and evidently of coral, presenting a conspicuous white beach, and except in being smaller and devoid of an Interior lagoon, resembling the coral-islands of the Pacific.

Towards sunset, we were within three or four miles of the island of SULU or Jolo; much resembling some of the mountainous islands in the Feejeean Group, yet agreeing in general character with the portion of the East Indies thus far visited. Of several eminences, the highest seemed as much as two thousand feet in elevation; and proved lofty enough to intercept a thunder-shower, witnessed three days later. On the nearest portion of the island, scattered trees were distinguished; some on the crest of the ridges resembling tall palms, but with the glass, the terminal crown was observed to be divided.—On the 3d, the weather was nearly calm; and in the afternoon, the Vincennes anchored outside of the harbor, which leads to Soung, the principal town.—On the 4th, the calm continuing, the Vincennes was towed by boats into the harbor. The island, one of the most pleasant-looking visited during our voyage, presented everywhere the luxuriant freshness of a forest-region; and an unusually large proportion of the surface had been cleared for cultivation. We were not destined to become acquainted with the Interior; but Mr. Brackenridge and myself succeeded once in getting beyond the limits of the town, to the distance of a fourth of a mile along the beach.

On the 5th, a party, all well armed, proceeded in two boats to Marongas islet, outside of the harbor. At some distance from the shore,

the bottom came in sight, covered with living corals of different hues in great variety; but there were no traces of a coral-shelf, nor of exposed coral-rock: the beach was composed exclusively of fragmentary coral and shells; and immediately beyond, was an inundated *mangrove* swamp. Following the beach Eastward, we soon reached a solitary hill; three hundred feet high, covered with bushes and briery *Capparis* vines, and composed of volcanic *conglomerate*, or cellular *lava* containing angular rocky fragments. From a tree, growing on the summit of this hill, I obtained a view of the whole islet; in its configuration presenting a decided approach to the annular coral-islands of the Pacific. The mangrove-swamp back of the beach was now perceived to be somewhat extensive, the trees growing in bands and patches in a sort of shallow lagoon; and beyond, was what seemed to be a detached islet, altogether low, and consisting of only a beach and mangrove swamp. There was no wind; the weather was exceedingly hot and sultry; and in many places, the foliage was curled, as though on the point of drying, an indication of more than usual heat and drought. After proceeding along the face of the rocky hill until stopped by overhanging swallow-caves, we returned to the boats. We next landed on the Western end of the islet, where a coral-beach only surrounded the mangroves in the lagoon: and after an interview with some natives at the lagoon outlet, returned towards sunset to the Vincennes.

On the 6th, the Vincennes sailed; with a breeze from the Northward and Westward, yet not so far ahead as to drive the ship from her course; and we made rapid progress through a sea very little ruffled. We passed some low coral-islands, that altogether resembled those of the Pacific; but even from aloft, no traces could be distinguished of an Interior lagoon; perhaps present, but concealed behind the uniformly dense growth of trees.

On the morning of the 7th, we arrived in sight of KAGAYAN SULU; mountainous, and some ten miles in diameter, an island on a smaller scale much resembling Sulu. At a little distance from the coast, were some detached small rocky islets; but notwithstanding our rapid progress, Kagayan Sulu continued in sight the whole day. At night, we took in sail, sounding at intervals until past midnight; when the ship was anchored upon a shoal.

On the morning of the 8th, the breeze was stronger, and the surface of the ocean much rougher. The Vincennes proceeded, and a little

past noon, anchored at the MANGSI CORAL-ISLETS; a cluster between the two high islands of Balabac and Banguey, in the middle of the strait or passage leading out of the Sulu Sea, and separating Palawan from Borneo. We found here three coral-patches; one of them devoid of vegetation, in the distance a mere white line on the surface of the ocean; the other two, covered with large trees. On landing, we met with a very considerable variety of plants; and among them, certain species hardly or not at all seen since leaving the coral-islands of the Pacific. Frequent and heavy showers fell during the three succeeding days; but this did not deter us from spending much of the time on shore.

From our anchorage, the continuously-elevated island of BALABAC was barely visible in the North. In the South, BANGUEY was somewhat nearer; containing a mountain almost "sixteen hundred feet" in elevation: towards which the Vincennes sailed on the 12th, bringing into view the low Northeastern end of the island.

Continuing beyond, another island in the Southwest came in sight; of very considerable extent, but entirely flat like a coral-island. We were here only "twelve miles" from the main land of Borneo; which being low, around the coast, was not visible even at this our nearest approach.

The following plants were found growing on Mindanao, Sulu, and the Mangsi coral-islets:

Dillenia (compare No. 2 Luzon). A tree, sixty feet high; leaves sometimes a foot long. Growing in the forest, back of Caldera on Mindanao. No specimens.*

Cocculus (No. 1). Hairy; numerous small flowers. On the islet at Sulu.

——— (No. 2). Stem pubescent; leaves smooth, simply ovate. On the Mangsi coral-islets.

Capparis (No. 3); congen. Feejeean. A vine; the stem with recurved prickles; leaves furfuraceous; flowers rather small. At Caldera on Mindanao. The Mindanao sp. seen also on the islet at Sulu.

——— (No. 4); not before met with; congen. Feejeean. A troublesome vine, with hooked prickles; leaves smooth, broad-lanceolate, green on both sides. On the islet at Sulu.

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* Gen. Cleomac.; bis (No. 1) Banos on Luzon. Yellow-flowered. Frequent around the landing-place at Caldera.

Urena; perhaps the Polynesian species, (Metia to Tongatabu and No. 1 Feejee Islands). At Caldera. No specimens.

Sida. Some species seen at Caldera; perhaps not indigenous.

Durio Zebithinus, (No. 1). The fruit at a little distance having an odor not unlike that

——— (No. 5); seeming distinct. Stem covered with short toment.; small smooth flowers on long pedicels. On the islet at Sulu.

——— (No. 6); congen. Feejeean?, but no prickles. Weak-stemmed; leafy; the flowers woolly. On the islet at Sulu.

(Decaschistia?, No. 1); like Trionum, but the calyx not inflated. Leaves tripartite; flowers yellow, turning to purple in drying; stigma with four petaloid lobes. In the opening in the forest, back of Caldera.

Paritium tiliaceum, (bis No. 1 Metia to the Hawaiian and Feejee Islands and Luzon, and compare Brazil). On Sulu, growing around the town.

Thespesia populnea, (bis No. 1 Samoan to the Feejee Islands). On the sea-beach at Caldera; and a single stock on the beach of the islet at Sulu; rare also on the Mangsi coral-islets.

Helicteris? (No. 2); scattered hairs; leaves alternate, denticulate, having two large round stipules at base; no flowers, nor fruit. At Caldera on Mindanao.

———? (No. 3); seeming congeneric. Much more pilose. At Caldera on Mindanao.

Heritiera; compare (No. 1) Tongatabu (to the Feejee Islands); under surface of the leaves sericeous, almost silvery; no flowers. On the islet at Sulu. The fruit washed ashore on the Mangsi coral-islets, the species being the same as at Tongatabu.

Pterospermum acerifolium, (bis No. 1 Luzon). A large tree. Frequent in the forest back of Caldera on Mindanao.

——— suberifolium, (bis No. 2 Luzon). A large tree. Likewise frequent in the forest at Caldera on Mindanao.

Sterculia? (No. 1); leaves with a sinus at base, and 5-lobed, the under surface of the nervures softly pubescent. At Caldera on Mindanao.

(———?, No. 2; recorded as) Heritieroid?. Leaves broad-ovate, penninerved; flower inconspicuous, the calyx cylindrical with the apex 5-fid; no corolla; stamens about twenty; capsule while young 5-angled, the angles afterwards growing outwards into regular pods, like those of Sterculia. Growing on Sulu.

Micromelum (No. 2); leaves pinnate, 6-jugis, the leaflets penninerved. On the Mangsi coral-islets.

Triphasia trifoliata, (No. 1, bis Luzon). Frequent at Caldera on Mindanao, and seeming indigenous.

(Atalantia?, No. 1; recorded as) Aurantiac.? Weak-stemmed, almost a vine; spines; leaves with black dots. On the islet at Sulu, growing on the hill-top.

(———?, No. 2); a congener of Sulu hill sp. Leaves dotted; panic. extra-axillary, and a terminal one besides; five sepals, and five petals; fruit as large as a cherry, purplish green. On the Mangsi coral-islets.

(———?, No. 3; recorded as) Aurantiac.? Leaves simple; umbel of fruit; the berry very small, obtuse, but seen only in the young state. On the islet at Sulu.

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of wild grapes, Vitis labrusca, and less disagreeable than was anticipated; the flavor presenting nothing attractive on the first trial; the pulp containing sulphuretted hydrogen in sufficient abundance to blacken silver spoons. The fruit sold in the market of the town on Sulu.

Astrapæa (compare No. 1 Luzon). Apparently this plant, growing near the dwellings of the natives at Caldera. No specimens.

Calophyllum inophyllum, (bis No. 1 Metia to the Feejee Islands). On the Mangsi coral-islets; and apparently the same species, sub-maritime, growing along the sea-coast at Caldera.

———; near (No. 2) Samoa (to Tongatabu); leaves narrow, lanceolate, with parallel nervures. On the Mangsi coral-islets.

(Garcinia?, No. 1; recorded as) Clusioid; large leaves; no flowers. On the Mangsi coral-islets.

(Hippocratea?, No. 1); bis?. A vine; leaves opposite, entire, subcordate, 5-nerved; terminal panicle of inconspicuous flowers; five sepals, and five petals. On the Mangsi coral-islets.

Dodonæa; compare Polynesian sp. (Brazil, Peru, and No. 1 Metia to the Hawaiian and Feejee Islands). At Caldera; and also, on Sulu.

Sapindus? (No. 4); leaves very large, paripinnate, smooth, reticulate. At Caldera on Mindanao.

(Cupania?, No. 5; recorded as) Sapindac.?; a congener of Feejeean sp. Leaves trijugis; axillary cymes; sepals five; capsule attenuate, compressed, bivalved, having two-cells, each one-seeded; the seeds having a large tubercle at base. At Caldera on Mindanao.

(Ornitrophe?, No. 2). Cupanioid; leaves trifoliolate, Rhus-like, the leaflets crenulate; long slender racemes; berry small, dicoccous. On Sulu.

Gen. Meliac.? (No. 2). A tree, sixty feet high; panicles; tuberc. peduncle, but the fruit apparently abortive. On the Mangsi coral-islets.

———? (No. 3); leaves pinnate; the leaflets 5-jugis, entire; fr. in clusters; sepals 5; style single; berry pubescent. At Caldera.

Leea (compare Feejee Islands and Luzon). One or more species; the leaves in some instances broad and large. Abounding in the forest back of Caldera.

Cissus (No. 7). Sub-herbaceous; leaves mostly 7-partite. On the Mangsi coral-islets; and apparently the same species? seen at Sulu.

———? (No. 8). Stem thick, herbaceous, cylindrical; leaves broad-cordate, articulate on the petiole. On Sulu, growing within the limits of the town.

(Gen. Ochnoid, No. 1). Ochna-like fruit, of three berries (on a common receptacle), observed on Sulu.

Xylocarpus (bis Tongatabu to the Feejee Islands). On the islet at Sulu.

Gen. (Samaroid?, No. 1). A vine; leaves opposite, entire; axillary spine; sepals distinct; four petals, alternating with the stamens; berry round, pisiform, crowned with the large stigma. On Sulu.

Gen. incert., (No. 1); Kiggelaria-like. A tree; four sepals, and four petals; fruit acorn-like, superior, crowned with the stigma. On the Mangsi coral-islets.

Colubrina Asiatica; bis (No. 1 Metia and) Taheiti (to the Hawaiian and Feejee Islands). On Sulu, growing within the limits of the town.

Citrus Sinensis, (bis No. 3 Luzon); the mandarin orange. Skin of the fruit easily detached, having the inner fibrous substance dryer than in the true orange. Some varieties have the fruit very small, hardly more than an inch in diameter. For sale in the town on Sulu.

Averrhoa carambola, (No. 2); the fruit five-winged, and called "karambola." For sale in the town on Sulu.

Gen. incert., (No. 1). A shrub; leaves opposite, entire; berry Thea-like, three-valved, five small sepals at the base. In the deep forest, at Caldera on Mindanao.

Suriana maritima, (bis No. 1 Paumotuan and Bellinghausen coral-islands, and Taheiti). A single bush, growing near the deserted huts, or rather encampment, on the Mangsi coral-islets.

Gen. Terebinthac.? (No. 1); or compare Sapindac. Entirely pubescent; leaves pinnate, the leaflets trijugis; flowers panicled. At Caldera.

Rhus? (No. 6). A tree, thirty feet high. On the Mangsi coral-islets: being perhaps the plant that produced a cutaneous eruption on some of our party. No specimens.

Gen. incert., (No. 1). A shrub; smooth; leaves pinnate, 5-jugis, sinuately dentate. At Caldera.

Sophora; bis, apparently the silky sp. (No. 1) Taheiti (to the Feejee Islands). On the Mangsi coral-islets.

Crotalaria (No. 4); leaves lanceolate; pods hairy. In the opening in the forest, back of Caldera.

Gen. Desmodioid, (No. 1); like Desmodium, but the leaves pinnate. The leaflets bijugis, and provided with stipels; the flowers in a long Dalea-like spike. In the opening in the forest, back of Caldera.

——— (No. 2); leaves pinnate, large, smooth; fr. small. On Sulu.

(Dendrolobium, No. 2); near (No. 1) Samoan (to the Feejee Islands). An arborescent shrub, ten to eighteen feet high, spreading at the summit; the stem six inches in diameter; pod somewhat thickened. On the islet at Sulu.

Desmodium (No. 10); pubescent; capit. In the opening in the forest, back of Caldera.

Abrus precatorius, (No. 1; bis Metia to the Feejee Islands). Frequent, either at Sulu or the Mangsi coral-islets, and apparently indigenous.

Dolichos; compare Polynesian sp. (No. 1 Taheiti to the Hawaiian and Feejee Islands); yellow-flowered. On the Mangsi coral-islets; maritime.

Canavalia (No. 2; compare No. 1 Samoan to the Hawaiian and Feejee Islands); the pod seeming large; leaves penninerved; flowers purple. Growing along the beach on the Mangsi coral-islets.

(Derris); compare (No. 1) Feejee Islands, and Glycine. Robinia-like, but a vine; leaves pinnate, the leaflets ovate, acuminate; flowers purple; pods short, compressed, membranaceous. At Caldera.

(Pongamia, No. 3); compare Feejee Islands, (and No. 2 Luzon); Robinia-like. A tree of medium size; leaves penninerved; pod thick, coriaceous, compressed. Sub-maritime; growing behind the beach at Caldera.

Guilandina; bis (No. 1 Samoan to the Feejee Islands and Luzon). Sub-maritime; observed growing at Caldera; and a drifted seed found on the Mangsi coral-islets.

Indigofera (compare Taheiti, the Samoan and Hawaiian Islands, Luzon, and No. 25 Peru). A shrub, four feet high. Planted around the dwellings of the natives, in the vicinity of Caldera.

Cajanus Indicus, (No. 1, bis Hawaiian Islands and Luzon). Planted by the natives in the vicinity of Caldera.

Erythrina; apparently the Polynesian sp., (Taheiti to Tongatabu, and No. 1 Feejee

——— ?; but the leaves more deeply crenate. A spiny shrub; no flowers. Frequent at Caldera.

Cassia alata, (bis No. 4 Luzon). Frequent at Caldera; and apparently indigenous.

Bauhinia (No. 2). A species observed in the forest back of Caldera.

Acacioid ?. Leguminous trees, of which no specimens were collected, were observed at Caldera.

Pemphis acidula; bis (No. 1 Paumotuan to Phœnix and Wake's) coral-islands; but larger, in some instances twenty feet high with the trunk a foot in diameter. Growing along the beach of the islet at Sulu.

Jussiæa (No. 2); perhaps the sp. seen at Manila; flowers small. Frequent in marshy ground at Caldera.

Rhizophora (compare No. 1 Samoan to the Feejee Islands and Luzon). Sometimes thirty feet high with the trunk eighteen inches in diameter. Occupying on the mud-flats most of the lagoon of the islet at Sulu.

Bruguiera (bis No. 1 Samoan to the Feejee Islands). In the East Indies, first met with on reaching Sulu.

(Lumnitzera ?, No. 2); compare (No. 1 Tongatabu to the) Feejee Islands; Terminalioid. A salt-water shrub; habit of Bucida; leaves attenuate, long-petioled; no flowers. On Sulu, growing within the limits of the town.

Terminalia (compare No. 2 Samoan to the Feejee Islands); the fruit seeming smaller than in the Samoan sp., and in greater quantity; leaves pubescent. On the Mangsi coral-islets.

——— (No. 5); not before met with. A small tree; leaves obovate, smaller than in the other species thus far met with. Growing on the hill-side, on the islet at Sulu.

(Gen. Terminalioid, No. 2); Dillenia-like; leaves alternate, penninerved; the petiole with a decid. ala. At Caldera.

Memecylon ? (No. 4). Twelve to fifteen feet high. Growing at Caldera.

(Gen. Memecyloid, No. 1). A shrub; habit of Daphne, but no inner cloth-like bark; stem jointed; flowers in capit. in thyrsi; calyx 4-fid; petals small, distinct, "lilac-colored." At Caldera.

Sonneratia acida, (bis No. 1 Luzon). Sub-maritime. Frequent on Sulu; and apparently the same species, but without flowers, observed at Caldera.

Islands), but flowering while in leaf. A large tree, the flowers scarlet. On Sulu, planted within the limits of the town.

Cæsalpinia (compare No. 1 Luzon). A tree; the leaflets inequal; pod compressed, smooth, somewhat thickened and leathery. On Sulu, within the limits of the town.

Jambosa Malaccensis, (bis Taheiti to the Hawaiian and Feejee Islands, and No. 1 Luzon). Red Malay-apples, small, obovoid, and of inferior quality, for sale in the town on Sulu.

Bryophyllum calycinum, (bis Luzon). On Sulu, frequent within the limits of the town.

(Adenostemma viscosum; No. 1, bis Taheiti to the Hawaiian and Feejee Islands). In a taro-plantation at Caldera; showing the probable mode of introduction into the Polynesian Islands.

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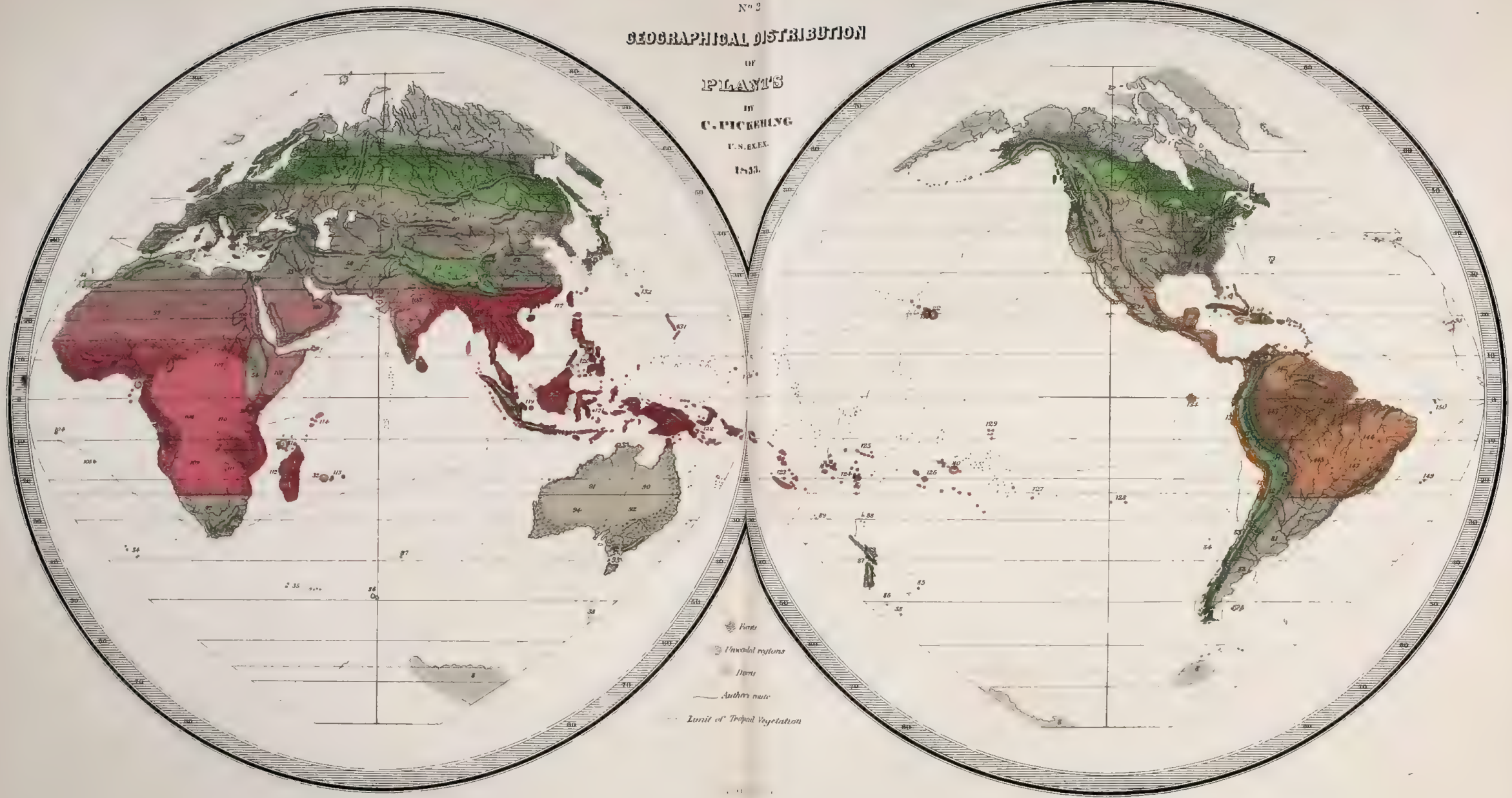

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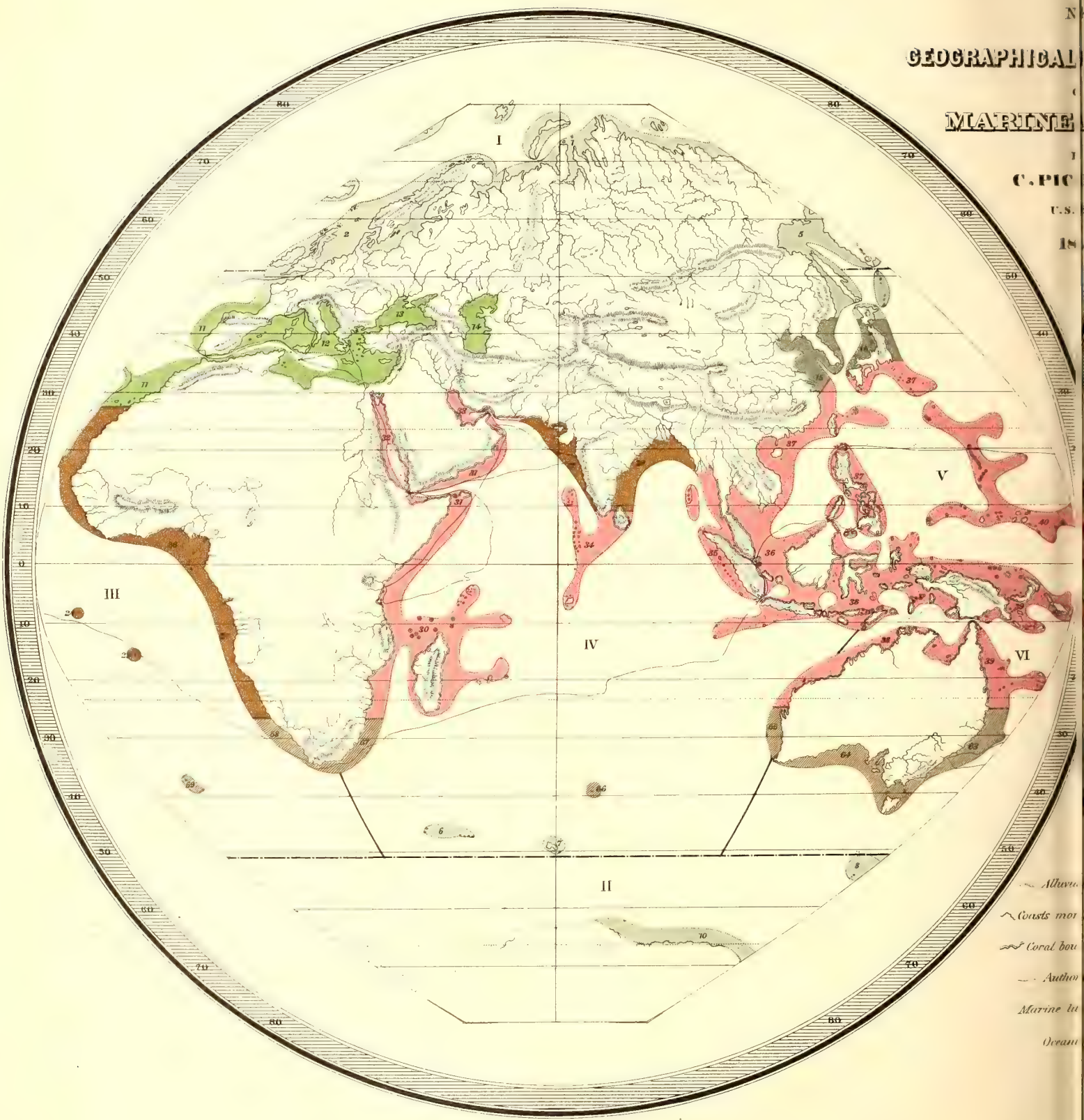

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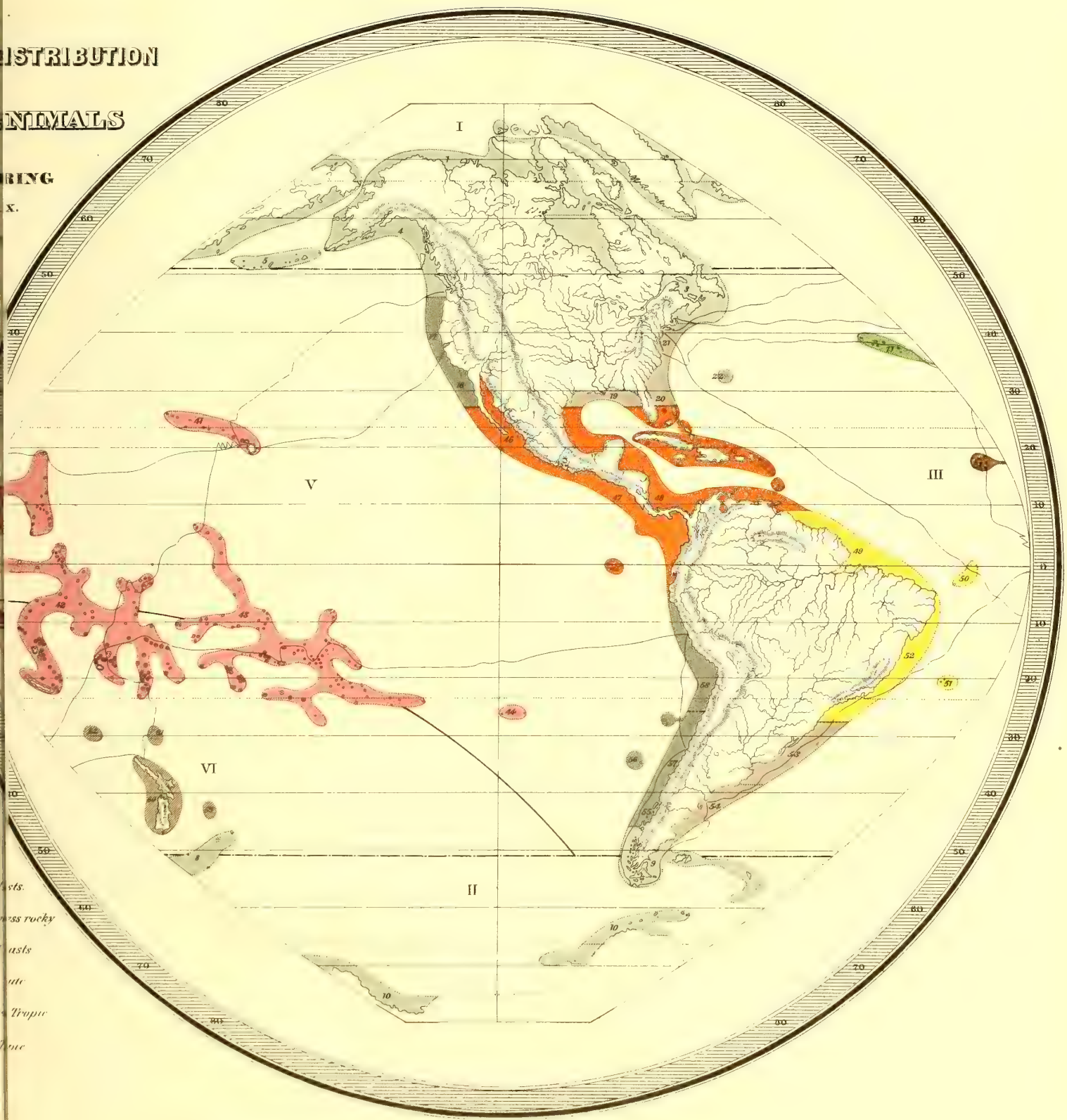

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